SOUTHERN POWER AND INDUSTRY

DECEMBER, 1955

SPI's 51st Year

Presenting material that will help solve design, installation, operating and maintenance problems in manufacturing, processing, service and power plants.

Complete Contents on Page 3

HYDRAZINE CASE STUDY . 46

Used successfully at Duke Power Company as means of preventing oxygen corrosion . . . no undesirable side effects produced . . . use does not require unusual equipment or techniques

ELECTRICAL QUESTIONS . . 48

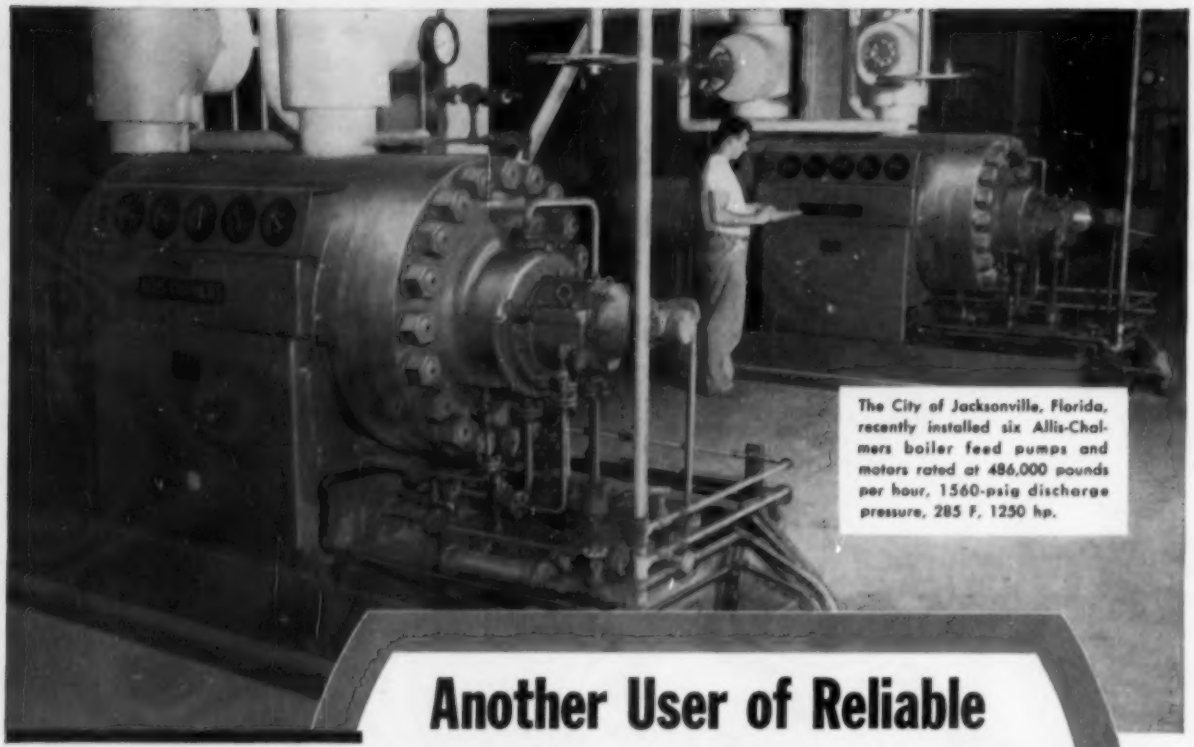
Questions and answers for industrial electricians . . . cover daily plant problems . . . see if you can make 70 or better on these problems

SEA WATER IN INDUSTRY . 50

Consultant for Dow Chemical in Texas reports on problems encountered when using sea water in industrial equipment . . . design, operating and maintenance guides

OTHER FEATURES

Roof Drain System—Arkansas 53
Humidity Control—Oklahoma..... 72
Packaged Generators—Kentucky..... 76



The City of Jacksonville, Florida, recently installed six Allis-Chalmers boiler feed pumps and motors rated at 486,000 pounds per hour, 1560-psig discharge pressure, 285 F, 1250 hp.

Another User of Reliable ALLIS-CHALMERS barrel-type PUMPS

City of Jacksonville

Here are the reasons for wide acceptance of these pumps:

- Outstanding performance — fully proved by service records.
- High efficiency and smooth operation under fluctuating loads — first stage has twin, single-suction impellers for low NPSH requirements.
- Simple maintenance—expansion joint and shaft seals are brought to outside of pump where they can be easily inspected.
- No balancing device needed—axial balance is maintained by back-to-back mounting of the impellers.

THERE are outstanding features like these throughout the Allis-Chalmers line. Whether you require boiler feed, condensate, circulating or other power plant pumps — it pays to standardize on Allis-Chalmers.

In addition, A-C can supply pumps, motors and control of coordinated design and manufacture. This means one responsibility — one guarantee of satisfaction.

Get complete information on barrel-type boiler feed pumps. Call your nearby A-C office or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin for Bulletin 08B7899.

A-4854

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

SOUTHERN POWER & INDUSTRY is published monthly at 56th & Chestnut Sts., Philadelphia 39, Pa., by W. R. C. Smith Publishing Co.
Executive and Editorial Offices: 806 Peachtree St., N. E., Atlanta 5, Ga. Entered as second-class matter at the Post Office, Philadelphia, Pa.
Subscription Rates: United States and Possessions, $1.00 per year or three years for $2.00; Foreign Countries, $10.00 per year.

Volume 73 Number 12

"PACKAGED" FANS

Clarage V-belt Ready Units answer economically your smaller air handling requirements

complete Ready to run, with fan, motor, and drive in one compact, easily installed assembly. 18 sizes, wheel diameters 9¾ to 32½", capacities to 12,000 cfm. Direct connected units also available.

adaptable Quickly adjustable in the field for various directions of air discharge. Slow speed, forward curved blade wheels or medium speed, backwardly inclined blade wheels available. Special units for handling corrosive gases and other special assignments can be provided.

rugged Typical Clarage heavy-duty construction throughout. All working parts readily accessible, yet entire drive (except on largest sizes) is within frame of unit — an important distinguishing feature!

quiet When properly selected and applied, Clarage Ready Units meet the most exacting requirements in respect to quietness of operation.

capable Within their performance range, these units are unsurpassed for maximum air delivery at low power cost. You can select them with confidence for ventilation, exhausting, and other low pressure applications.

For 28 pages of complete information on Clarage Ready Units, request Catalog 515.

View of a standard Ready Unit as built in the medium-size range. Note how operating parts are shielded.

Ready Unit equipped with drive guard (at the end) and outdoor covers (on the sides) which provide complete weather protection.

CLARAGE FAN CO., Kalamazoo, Mich.

You can Rely on **CLARAGE** ... *dependable equipment for making air your servant*

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

Cool savings for Hotpoint...

For the past five years, Hotpoint Co., Milwaukee, has been using *Texaco Regal Oil R&O* for all its turbine lubrication. And here's what L. E. Sweet, Plant Manager, has to say about it:

> ***"Texaco Regal Oil R&O has done a consistently fine job for us. It keeps our turbine blower systems exceptionally clean — no sludge, no rust, no foam. The oil stands up in severe service, bearing temperatures are always normal and governor response always immediate."***

Texaco Regal Oil R&O is a premium-quality oil. Special refining and effective additives *improve* its naturally fine properties, give it an extra long service life and enhance its ability to resist oxidation and prevent sludge, rust and foam.

There is a complete line of *Texaco Regal Oils R&O*. All meet the stringent requirements of leading turbine builders. A Texaco Lubrication Engineer will gladly help you select the proper one. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

HOTPOINT'S GOLDEN ANNIVERSARY is being celebrated this year and Texaco salutes this "Pioneer of the All-Electric Kitchen." We are proud that Texaco Lubricants and Lubrication Engineering Service are so widely used to help speed production of the famous Hotpoint kitchen and laundry appliances.

TEXACO

TEXACO Regal Oils R & O

FOR ALL TURBINES

TUNE IN . . . TEXACO STAR THEATER starring JIMMY DURANTE on television . . . Saturday nights, NBC.

SOUTHERN POWER AND INDUSTRY

Vol. 73
No. 12

DECEMBER, 1955

Eugene W. O'Brien, Managing Director

•

Francis C. Smith, Editor

Richard L. Priess.....Associate Editor

Milton C. May.....Field Editor

John F. Lee.....Consultant on Atomics

•

J. A. Moody, Production Manager

•

Business Representatives

E. L. Rogers, 299 Madison Ave., New York 17, N. Y.—Phone Murray Hill 3-4960.

George Isherwood, 599 Rutherford Dr., Springfield (Del. Co.), Pa.—Phone KI 3-0760.

J. D. Parsons, 39 Atlantic Ave., Cohasset, Mass.—Phone 4-0712.

A. E. C. Smith, P. O. Box 3054, Cleveland 17, Ohio.—Phone Cherry 1-7352.

A. C. Petersen, 333 North Michigan Ave., Chicago 1, Ill.—Phone Central 6-6964.

L. B. Chappell, 810 So. Robertson Blvd., Los Angeles 35, Calif.—Phone Crestview 4-5151.

Karl H. Mayers (for N. J. north of Trenton), 11 Ale Wives Road, R.F.D. 2, Norwalk, Conn.—Phone Temple 8-2187.

W. Cliff Rutland, P. O. Box 102, Gastonia, N. C.—Phone University 7-7995.

•

Annual Subscription—$1.00
Foreign—$10.00

•

Published monthly by
W. R. C. SMITH PUB. CO.
Atlanta, Ga., and Philadelphia, Pa.

Publishers also of *Textile Industries, Electrical South, Southern Hardware, Southern Automotive Journal, Southern Building Supplies, and Southern Appliances.*

W. J. Rooke, Chairman of the Board; R. P. Smith, President; T. W. McAllister, Vice-President; E. W. O'Brien, Vice-President; A. E. C. Smith, Vice-President.

Feature Articles in This Issue

Design, Operation and Maintenance

The Use of Hydrazine—Duke Power Company 46
Questions & Answers for Industrial Electricians 48
Use of Sea Water in Industry—Part 2 of Texas Report 50
Roof Drain System for Fuel Storage Tank—Arkansas 53
How a Fuel Bill Was Cut—S.C. Reader Comment 54
Chain Type Flexible Couplings, by H. E. Hyler 62
Controlled Volume Pumps in Rubber Plant 68
Humidity Control in Comfort Cooling—Oklahoma 72
Packaged Generators in Kentucky Processing Plant 76

Helping the Man-in-the-Plant

Installing Ball or Roller Bearings 52
Control of Multiple Pump Operation 80
Regenerative Fly Ash Collector 84
How to Make Correct Heater Connections 84
Shop Housekeeping as a Production Tool 86
Dust Saving Pays for Unit in 12 Months 92
Boiler Diet Change Beneficial 92
Use of Molybdenum Cam Lubricant 92
Impact Wrench Holder Design 93

Regular Features—Departments

Facts and Trends 4
News of the South 10
Future Events 12
Buyers Information 16
Timely Comments 43
Industry Speaks 45
New Equipment 94
Index to Advertisers 116

Contents indexed regularly by Engineering Index, Inc.

Copyrighted 1955 by W. R. C. Smith Publishing Company

Editorial and Executive Offices: **SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E. ATLANTA 5, GEORGIA**

Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

December, 1955

► ELECTRICIANS! PLEASE NOTE! Robert U. Garrett, Chief Electrician, Oerlikon Tool & Arms Corp. of America, Asheville, N. C. worked up a series of questions and answers for industrial electricians based on experience and the National Electric Code. Questionnaire was developed to determine the qualifications of applicants for the position of Journeyman Electrician in the plant.

The questions and answers, featured in this issue, are non-technical and cover problems, methods and general knowledge which is required almost daily by the practical maintenance man. Any electrician who can make 70 or better on this test can be considered to have a good, practical, workable knowledge of industrial electrical work.

► VETERAN TURBINE--A pioneer 3250 kw Allis-Chalmers steam turbine-generator is being retired by the Virginia Electric & Power Co., Richmond, Va., after 47 years of service. In 1908, it was the highest rated 1800 rpm machine in the country.

The turbine has delivered as high as 5500 kw for several hours in the course of many years on peak evening load duty. When inspected three years ago, the unit was found in good condition and it was still in good operating condition at its retirement. Maintenance costs on the machine were extremely low, with 47 years of replacements listed on one-half of a repair index card.

► INDUSTRIAL X-RAY COSTS will undoubtedly be drastically slashed as the result of a miniature-film technique that greatly reduces both film and processing costs.

It's called PHOTOFLUOROGRAPHY--method of reducing x-ray images in size so that they can be focused on to small-size film. Since x-rays themselves cannot be focused a fluorescent screen, sensitive to x-rays, is interposed between the object and the film. The visible light, excited from the screen by x-rays, can then be focused on to any size film desired.

Same technique has been used in the medical field for many years for the mass chest x-ray surveys, but has only recently been applied to x-ray inspection in the field of heavy industrial products such as castings, ordnance, weldments, etc., where high voltages in the range from 250,000 to 2,000,000 are required. Included in reduced processing costs are both the size of equipment and quantity of chemicals required.

► HYDRAZINE is being successfully used as a means of preventing oxygen corrosion without producing undesirable side effects. Its use does not require unusual equipment or techniques.

In this issue, E. C. Fiss, Director, Special Development Section, Duke Power Company, Charlotte, N. C., reports on recent feedwater treatment developments. Discussion covers: experience with sulfite, information on Hydrazine, tests with Hydrazine, application, present practice, and method of analysis.

(Continued on page 6)

DRUM SWITCHES

Bulletin 365 MULTISPEED DRUM SWITCHES for 2, 3, and 4 speed motors.

Bulletin 806 DRUM SWITCHES for pilot control and transfer switch service.

Open View of Bulletin 350 Drum Reversing Switch on Worthington welding positioner. Available up to 20 hp, 220 v; 40 hp, 440-550 v. For d-c motors up to 3 hp, 115-230 v.

MANUAL CONTROLS

for Alternating & Direct Current Motors

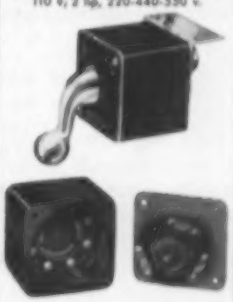
Bulletin 375-385 DRUM SWITCHES for polyphase, wound rotor induction motors.

There are many types of motor-driven machines for which a simple drum switch is the most suitable type of manual control. For such applications the Allen-Bradley line offers a wide variety of types and sizes of drum controllers up to 300 hp, 220 v; 500 hp, 440-550 v.

Practically any combination of switching operations can be arranged by the proper combination of drum segments and contact fingers. For complete information on Allen-Bradley drum controllers, send for the 120-page Allen-Bradley Handy Catalog.

Allen-Bradley Co., 1328 S. Second St., Milwaukee 4, Wisconsin
In Canada—Allen-Bradley Canada Limited, Galt, Ont.

Bulletin 350 Low Cost STYLE A DRUM SWITCHES for polyphase motors up to 1½ hp, 110 v; 2 hp, 220-440-550 v.



For Single Phase Motors up to 1 hp, 110 v; 1½ hp, 220 v. D-C motors—¼ hp, 110-220 v.

ALLEN-BRADLEY SOLENOID MOTOR CONTROL

CONSULT YOUR LOCAL ALLEN-BRADLEY REPRESENTATIVE

ALBUQUERQUE—A & A Supply Co., 114 Morningside Dr., N. E., Tel: 5-5506
ATLANTA—W. R. Calverley, 1000 Peachtree St., N. E., P. O. Box 7086, Sta. C., Tel: Elgin 8833
BALTIMORE—H. M. Wood & Co., 124 Light St., Tel: MUlberry 5-4643-4
BIRMINGHAM—J. L. Haworth Co., Inc., 3021 Seventh Ave., So., Tel: 53-1171
CHARLESTON—W. J. Hess & Son, Room 310 Morrison Bldg., 815 Quarrier St., Tel: 2-5323
CHARLOTTE—Le Roy P. Spoon, 307 Lincoln St., Tel: EDison 4-6334
DALLAS—J. K. Webb, 2810 McKinney Ave., Tel: Tenison 6179
HOUSTON—Wilson Electrical Equip. Co., 2930 Commerce Ave., Tel: Capitol 8-1557
JACKSONVILLE—Robert P. Smith & Co., 2031 Hendricks Ave., Tel: 9-9474
KANSAS CITY—B. L. McCreary & Son, 1819 Central St., Tel: Harrison 1668
KNOXVILLE—Bowditch & Co., 1311-C N. Broadway, P. O. Box 3145, Tel: 4-2513
LITTLE ROCK—Curtis H. Stout & Co., P. O. Box 107, 400 Shall St., FRanklin 4-8201
LOUISVILLE—Bletzo & Co., 2209 S. Floyd St., Tel: Calhoun 3603
MEMPHIS—Curtis H. Stout & Co., 718 M & M Bldg., Tel: 8-7601
MIAMI—Lee-Smith Co., 121 S.E. First St., Tel: 82-6766
NEW ORLEANS—Robbins & Robbins, 1037 Magazine St., Tel: Canal 5805
PHOENIX—James A. Satchell Co., Inc., 2115 S. 15th Ave., Tel: ALpine 2-9388
RICHMOND—H. M. Wood & Co., 2016 Second Ave., Tel: 3-8529
ST. LOUIS—Harold Julian, 904 N. Grand Blvd., Tel: JEfferson 5-1901
SAN ANTONIO—Wilson Elect. Equip. Co., 301 E. Maple St., Circle 4-2344
SAN DIEGO—James A. Satchell Co., Inc., 301 W. "G" St., Tel: BEllmont 3-3981
TULSA—John W. Rider Co., 1526 East Fourth St., Tel: Diamond 3-9149

Facts and trends (continued from page 4)

► MORE POWER--In 1954 the installed electric utility generating capacity in the South and Southwest was 33.7% of that of the country as a whole, a gain from 32.4% in 1953. This percentage gain may seem small in itself, but it represents a tremendous gain for one year. It is also to be remembered that before the war we had but 22% of the total installed capacity.

During the last year, the South and Southwest had a gain of over 16% in installed capacity. The rest of the country had a gain of less than 9% which shows how rapidly the area is going ahead of the rest of the country in gains.

Steam capacity (included in the above total) is growing too--the percentage for the South and Southwest is 33.8% of the United States total, as against 32.9% for 1953. The South gained 21% in steam generating capacity in utilities in the past year against a 10% gain for the rest of the country.

► STEAM TRAP TEST PLUG--Traps on steam tracers and jackets must function properly or a product freeze-up will occur. Monsanto Chemical Company in St. Louis, Mo., is successfully using the Vis-A-Plug, a simple, effective method of checking the operation of bucket type steam traps.

Device fits in the standard test plug opening of the steam trap, as a permanent part of the trap. So equipped, traps may be checked for proper performance with a flashlight. On good traps, a full and empty cycle occurs each time the trap dumps. But a blowing trap shows a steady continuous condition in the Vis-A-Plug glass.

► COLLEGE RESEARCH--Georgia Tech did nearly $2,000,000 of research last year, which makes it the South's largest and the nation's fifth largest among state engineering college research organizations. Elsewhere in the South, Texas A&M College had $1,370,000 in research; University of Florida--$1,000,000; and North Carolina State College--$438,000.

►A REVERSIBLE PUMP-TURBINE that produces power or pumps water is one of the developments in the hydraulic turbine industry discussed in the November issue of "Mechanical Engineering."

The reversible pump-turbine operates as a turbine in one direction of rotation, producing power. Operating in the opposite direction, it becomes a pump to pump water. The hydraulic unit on the pump-turbine is connected to a single electrical unit which serves as both motor and generator.

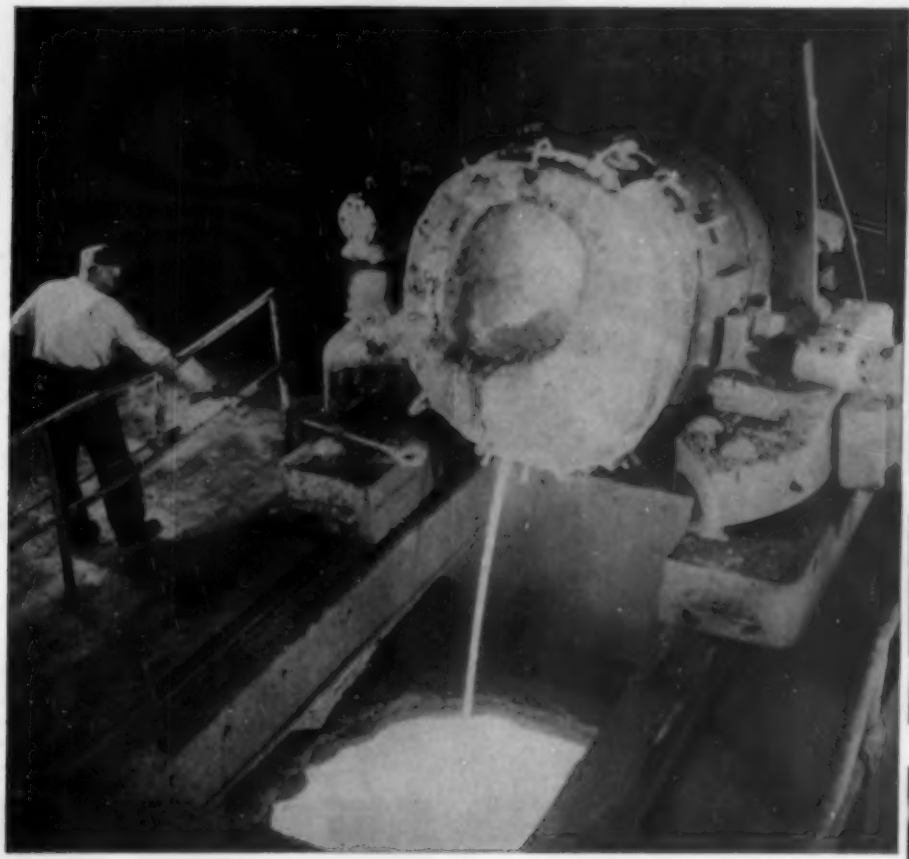
The world's largest reversible pump-turbine is now being installed at the Hiwassee Plant of the TVA. Designed and built by Allis-Chalmers, this biggest hydraulic prime mover is rated 80,000 hp at 190 ft head, as a turbine. As a pump, it has rated capacity of 3900 cu ft/sec at 205 ft head.

► MAINTENANCE COST in power plants is a relatively unexplored field which offers the greatest opportunity for savings in total production costs.

Some companies are putting major turbine inspections on a regular five-year basis. When dismantling equipment they find it less costly in the long run to keep enough men on hand to cope with every eventuality and to pay standby time than to call in additional men, or men of different skills, after finding out what is wrong.

Another utility lowered production costs by organizing its maintenance staff of about 450 men for all plants into one strongly centralized group, operating under one head. For details--check Industry Speaks in this issue.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.



Melting pig iron in the cupolas

Purifying iron in bessemer

An exact iron silicate is tapped

"Sponge ball" goes to the press

This exclusive 5-minute operation gives WROUGHT IRON built-in protection against corrosion

The pig iron has been melted in the cupolas . . . purified by the bessemer converter. An exact iron silicate has been readied in special rotary furnaces and moved by ladle beneath the machine holding the highly refined, molten iron . . . everything is ready for the key step.

The signal is given. The processing machine tips its ladle forward. Molten refined iron flows at a controlled, predetermined rate into the ladle holding the melted silicate. This operation is shown above. The falling iron stream penetrates into the silicate, then separates into droplets. Liberated gas from within bursts apart the solidifying droplets. The shattered fragments settle continuously to form a "spongy mass"—welding hot—in the molten silicate.

This "sponge," weighing three tons or more, is pressed into a rectangular block called a "bloom." Giant rolling mills give final form to the useful material—WROUGHT IRON.

Because the thousands of fibers of silicate gathered in the mixing operation and distributed through the body of high-purity iron are unaffected by corrosion, they establish a "defense in depth" against corrosive attack. This is why wrought iron stays on the job longer, at lower cost per year.

Our booklet, *The ABC's of Wrought Iron*, tells more of this story. Send for your copy.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. International Division: New York, N. Y. *Available in Canada and throughout the world.*

BYERS

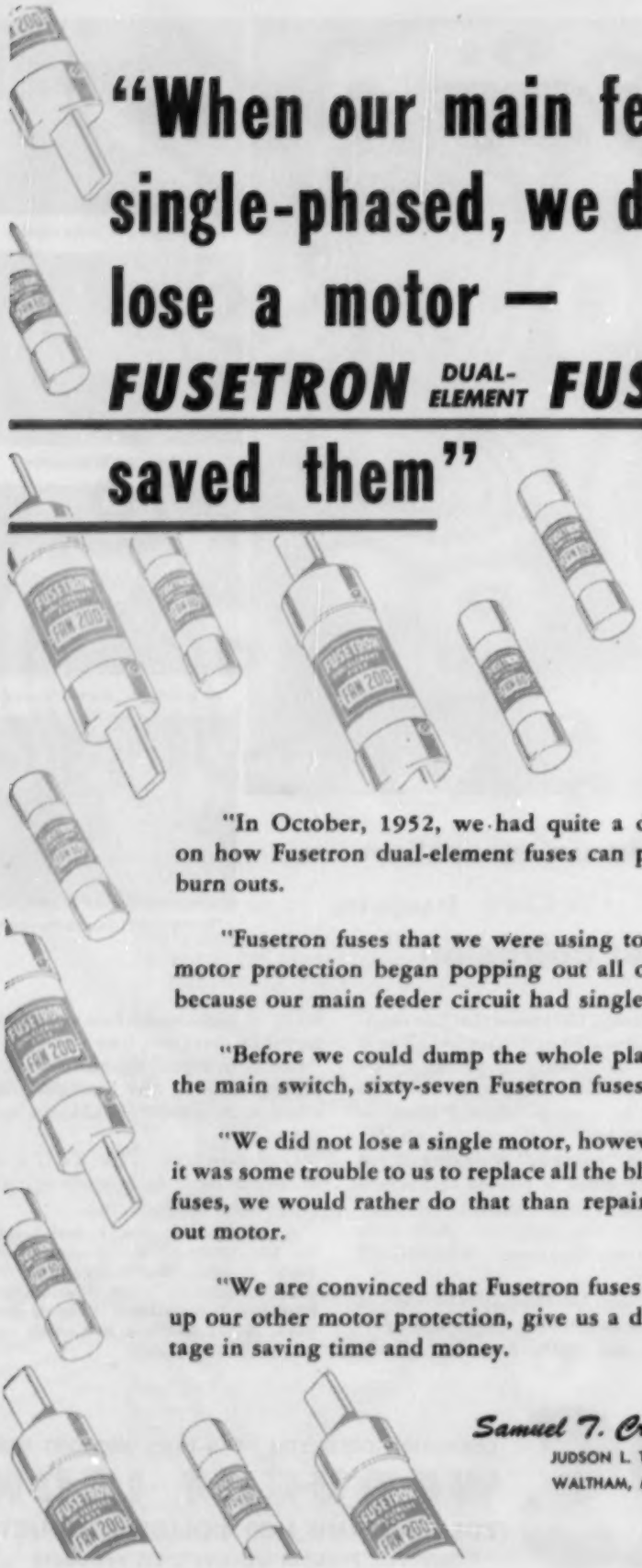
CORROSION COSTS YOU MORE THAN WROUGHT IRON

WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY STEEL PRODUCTS

"When our main feeder single-phased, we did not lose a motor — FUSETRON DUAL-ELEMENT FUSES saved them"



"In October, 1952, we had quite a demonstration on how Fusetron dual-element fuses can prevent motor burn outs.

"Fusetron fuses that we were using to back up our motor protection began popping out all over the plant because our main feeder circuit had single-phased.

"Before we could dump the whole plant by pulling the main switch, sixty-seven Fusetron fuses had opened.

"We did not lose a single motor, however, and while it was some trouble to us to replace all the blown Fusetron fuses, we would rather do that than repair one burned out motor.

"We are convinced that Fusetron fuses used to back up our other motor protection, give us a distinct advantage in saving time and money.

Samuel T. Craig CHIEF ELECTRICAL ENGINEER
JUDSON L. THOMSON MANUFACTURING CO.
WALTHAM, MASSACHUSETTS

FUSETRON dual-element FUSES DO MORE THAN PROTECT MOTORS AGAINST BURNOUT DUE TO SINGLE PHASING

. . . *They provide 10 Point Protection*

1. High interrupting capacity — protect against heaviest short-circuits. Have proven on tests to open safely on circuits set to deliver in excess of 100,000 amperes.

2. Protect against needless blows caused by excessive heating — lesser resistance results in cooler operation.

3. Protect against needless blows caused by harmless overloads.

4. Provide thermal protection — for panels and switches against damage from heating due to poor contact.

5. Protect against waste of space and money — permit use of proper size switches and panels.

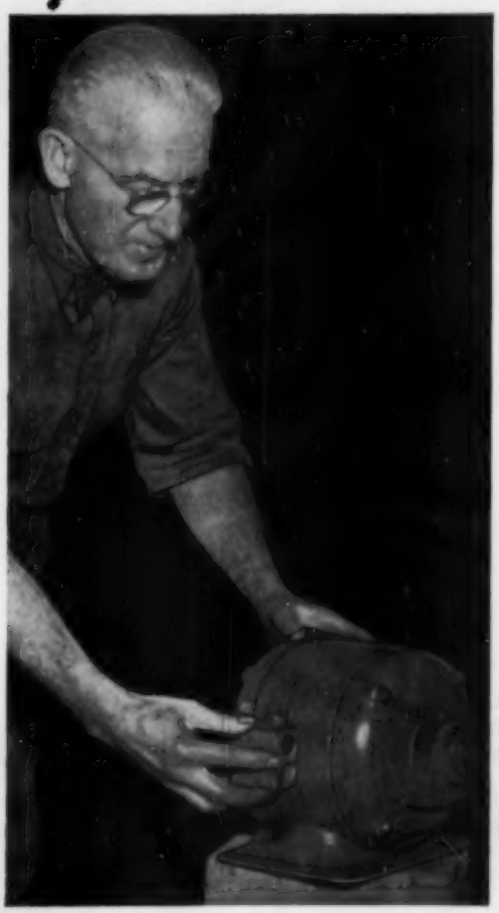
6. Protect motors against burnout from overloads.

7. Give DOUBLE burnout protection to large motors — without extra cost.

8. Protect motors against burnout due to single phasing.

9. Make protection of small motors simple and inexpensive.

10. Protect coils, transformers and solenoids against burnout.



AND FUSETRON FUSES REMAIN SAFE

without maintenance and recalibration costs

Once properly installed, Fusetron fuses require no costly inspection time or maintenance necessary on mechanically operated devices.

Dust, fumes, corrosion or age cannot prevent a Fusetron fuse from opening safely. There are no hinges, pivots or contacts to stick or slow down the operation of the fuse on short-circuit.

When a Fusetron fuse does open to protect, and after the fault has been corrected — the new Fusetron fuse you install has been calibrated at the factory by engineers — it is a fuse as safe and dependable as the one that blew.

Blowing time charts and more information are available on Fusetron dual-element fuses. Write for bulletin FIS.

FOR LOADS ABOVE 600 AND UP TO 5,000 AMPS . . . Use BUSS Hi-Cap Fuses

On 600 volts or less, they have interrupting capacity sufficient to handle any fault current regardless of system growth.

When coordinated with Fusetron fuses they will not open ahead of fuse nearest fault.

— Write for bulletin HCS —

Play Safe! *Install FUSETRON Fuses and BUSS Hi-Cap Fuses throughout entire Electrical System!*

FUSETRON
BUSS

BUSSMANN Mfg. Co. *Division of McGraw Electric Co.*
University at Jefferson, ST. LOUIS 7, MO.

NEWS *for the South and Southwest*

McJunkin Corporation Continues Expansion With Louisville Sales Office & Warehouse

LOUISVILLE, KENTUCKY, is the latest addition to the MCJUNKIN CORPORATION family of branches, which provides industry with industrial supplies; tubular goods; corrosion resistant products; oil, gas and water well supplies; and custom fabrication.

New branch office and warehouse of the Charleston, West Virginia, company is located at 1441 South Fifteenth St., Louisville, Kentucky. Initial stocks in Louisville consist of over 5,000 different items of some 180 leading manufacturers.

JOE CROUCH is Branch Manager of the Louisville operation; BILL SAMPLE, Gen. Sales Manager; and JACK THORNHILL, LEW LYLE, and PAUL SPROWLS, Salesmen. DICK HOLSTEIN is Warehouse Supt.

The 35 year old McJunkin Corporation ranks as the largest independent distributor of tubular goods east of the Mississippi. Stocks include sizes ranging from ⅛ in. to 72 in. OD pipe. Special large sizes up to 72 in. OD are rolled in McJunkin's Charleston, West Virginia, plant.

In addition to a large and complete stock of corrosion resistant products, McJunkin carries all major lines of supplies and equipment for the oil, gas, and water well supply industry. The company has also gained an outstanding position as a manufacturer of custom fabricated equipment such as heat exchangers, pressure vessels and related items. McJunkin also serves industry by contract manufacturing of special products where heavy machining, welding and forging are involved. This division is code-qualified on all types of alloys and carbon steel.

Willard McBurney and Sam Walleze

Walleze Joins McBurney Stoker & Equip.—Atlanta

SAM WALLEZE has joined the MCBURNEY STOKER AND EQUIPMENT COMPANY, 2110 Peachtree Road, N.W., Atlanta 9, Georgia.

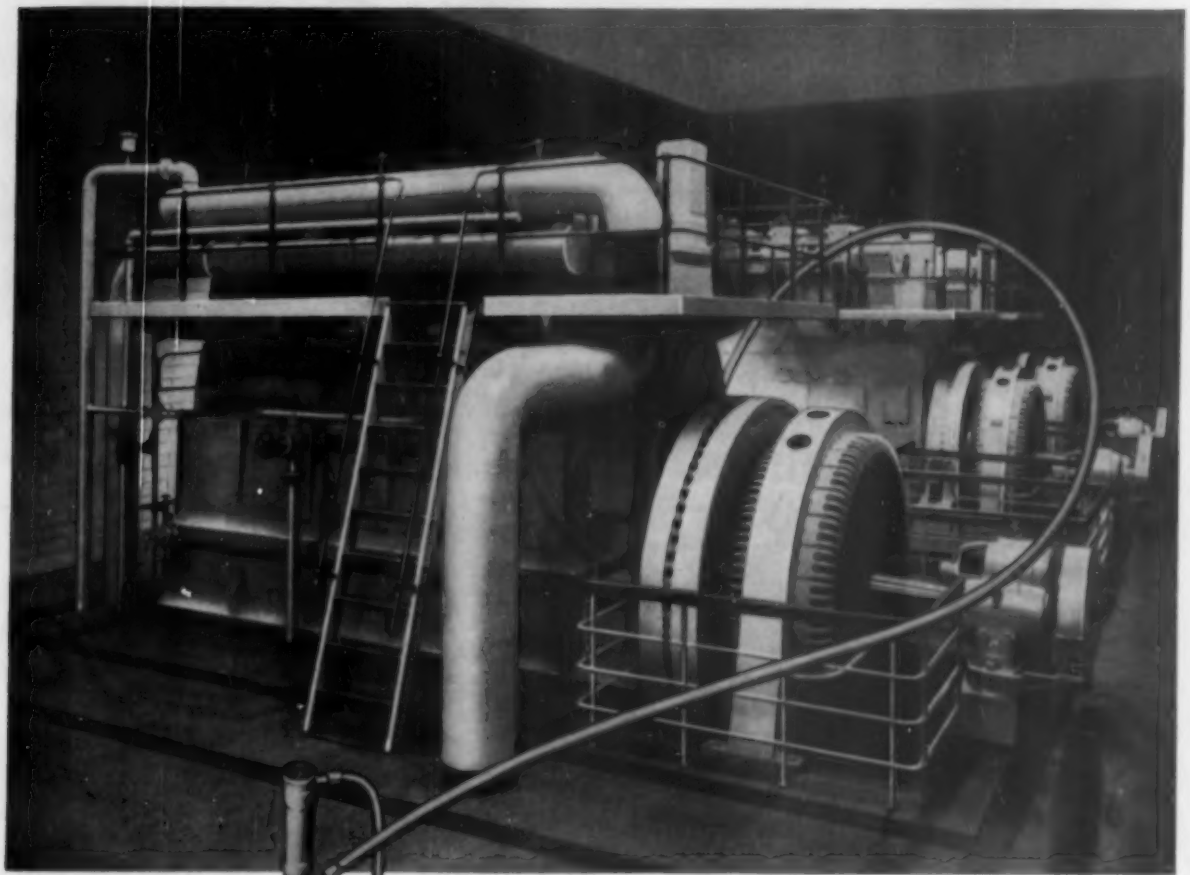
In making the announcement, WILLARD MCBURNEY, Vice President and General Manager, emphasized that Mr. Walleze's association with the company in a sales and engineering capacity would increase service to Southeastern manufacturing, utility and service plants. The McBurney company has served Southeastern industry since 1911, manufacturing and supplying boiler room equipment.

Mr. Walleze, a graduate of the U. S. Merchant Marine Academy, is a licensed marine engineer and served in the Naval Reserve in World War II. He has been associated with Leeds & Northrup, Western Electric, York Safe and Lock and the Special Ordnance Division of Blaw-Knox, in service and sales engineering work. In these capacities, he contacted leading national industrial firms, major utilities, and consulting engineers.

Mr. Walleze joins McBurney Stoker following seven years work with Copes-Vulcan in service and sales engineering fields. He and his family will soon move from Erie, Pa., to their new residence in Atlanta.

The expanded services of McBurney Stoker and Equipment Company now include: McBurney Underfeed Coal Stokers and spreader type wood refuse burners; Copes-Vulcan line, including combustion controls, feedwater regulators, desuperheaters, soot blowers, etc.; Thermco gas analyzers; National Airoil gas burners; and other power plant equipment.

Stops Sludge!



Guard your Diesel against sludge and carbon deposits – switch to Sinclair RUBILENE®, the lubricating oil with over 35 years of proven performance. RUBILENE's top quality means protection against "stuck rings"– prevents excessive wear of cylinders, pistons and other vital moving parts operating continuously for long periods. Sinclair RUBILENE pays off in reduced maintenance and less work during overhauls. Your Diesel stays on the job longer!

Switch over to RUBILENE. Regardless of the age or make of your Diesel, there's a member of Sinclair's famous RUBILENE or RUBILENE H.D. family that meets your needs exactly! Call your local Sinclair Representative or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

SINCLAIR

RUBILENE OILS

High Temperature Research Discussed at Atlanta Metals Society Meeting

Dr. Robert J. Raudebaugh (second from left), Research Metallurgist, **International Nickel Co.**, Bayonne, New Jersey, recently reported on high temperature research work in the metals field before the Georgia Chapter, American Society for Metals. Dr. Raudebaugh was Professor of Metallurgical Engineering at Georgia Tech for over five years and recently completed a two-year term as National Trustee of the American Society for Metals.

Also attending the Atlanta, Georgia, meeting were, left to right, **Richard J. Greene**, Southeast States Technical Field Section, **International Nickel Co.**; Dr. Raudebaugh; **A. Dick Boyd**, District Manager, **Carpenter Steel Co.**, Atlanta, Georgia, and also Chairman of the Georgia Chapter, ASM; and **John Nation**, Vice President, **J. M. Tull Metal & Supply Co.**, Southeastern distributors for International Nickel.

FUTURE EVENTS
Of Engineering Interest

AIR CONDITIONING & REFRIGERATION INSTITUTE, Washington, D. C.
Nov. 28-Dec. 1, 9th Annual Air Conditioning & Refrigeration Exposition, Auditorium, Atlantic City, N. J.

35TH EXPOSITION OF CHEMICAL INDUSTRIES, E. K. Stevens, Mgr., International Exposition Co., 480 Lexington Ave., New York 17, N. Y.
Dec. 5-9, Exposition, Commercial Museum and Convention Hall, Philadelphia, Pa.

INTERNATIONAL ATOMIC EXPOSITION, 931 Book Building, Detroit 26, Michigan.
Dec. 10-16, International Atomic Exposition, sponsored by American Institute of Chemical Engineers; and Nuclear Engineer and Science Congress, coordinated by Engineers Joint Council. Exposition at Public Auditorium, Cleveland, Ohio.

PLANT MAINTENANCE AND ENGINEERING SHOW, Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.
Jan. 23-26, 7th Plant Maintenance & Engineering Show and Conference, Convention Hall, Philadelphia, Pa.

INSTRUMENTATION CONFERENCE, Chemical Engineering Department, Texas A&M, College Station, Texas.
Jan. 25-27, 11th Symposium on Instrumentation for the Process Industries, Texas A&M, College Station, Texas.

EDISON ELECTRIC INSTITUTE, 420 Lexington Ave., New York 17, N. Y.
Feb. 6-10, National Industrial Electric Heating Conference, Netherland Plaza Hotel, Cincinnati, Ohio.

SOUTHERN SAFETY CONFERENCE, INC., W. L. Groth, Executive Director, Box 8927, Richmond 26, Virginia.
March 4-6, 17th Southern Safety Conference and Exposition, Biltmore Hotel, Atlanta, Georgia.

The Bellows Company Knoxville, Tennessee

THOMAS W. SUMPTER has been appointed by THE BELLOWS COMPANY, Akron, Ohio, to the position of Field Engineer in their Knoxville, Tennessee, office. Mr. Sumpter will be responsible for sales and service to the many industrial plants in Eastern Tennessee and Western Virginia which use the "Controlled-Air-Power" Devices manufactured by The Bellows Company.

Thomas Sumpter

Mr. Sumpter is a native of Nashville and attended the University of Tennessee. He has been associated with various industrial firms in Nashville before joining The Bellows Company. During World War II, he served with the War Production Board in Atlanta, Georgia.

Stephens-Adamson Mfg. Co. Opens Dallas Warehouse

The STEPHENS-ADAMSON MFG. CO., Standard Products Division, announces the opening of a new warehouse at 5623 Dyer Street, Dallas, Texas. The new facilities will enable the company to better service accounts in the Southwest with their stock line of conveyor machinery and accessory equipment. Ready for immediate shipment from the Dallas warehouse will be belt conveyor machinery, box car loaders and pilers, car pullers, winches, speed reducers and allied items.

Stephens-Adamson has been in the conveyor industry for over fifty years and is an important supplier to the Southwest's chemical and mining industry. The company's Standard Products Division is represented in Texas and Oklahoma by GENERAL POWER EQUIPMENT COMPANY of 5623 Dyer Street, Dallas, Texas.

Florida Power Corporation's Suwanee River Plant

The piping system for a new generating unit at FLORIDA POWER CORPORATION'S Suwanee River plant will be furnished and prefabricated by DRAVO CORPORATION, Pittsburgh, Pa.

This new unit, now under construction near Ellaville, Florida, will more than double the Suwanee River plant's present capacity and add 70,000 kw net capability to their system. Powered by a 600,000 pound per hour steam generating unit, the turbine generator will operate on 1450 lb steam at 1000 F with reheat to 1000 F. Dravo will fabricate the main, intermediate and low pressure steam piping for the unit.

The new station unit which was designed by Black and Veatch, Consulting Engineers, Kansas City, Missouri, is scheduled for completion by late 1956. When completed it will bring Florida Power's net system generating capability to 600,000 kilowatts.

More News—Page 104

NM
CH_3NO_2

NE
$CH_3CH_2NO_2$

THE CSC NITROPARAFFINS

New Stars

to give new direction to the chemical industry

2-NP
$CH_3CHNO_2CH_3$

1-NP
$CH_3CH_2CH_2NO_2$

PHYSICAL PROPERTIES

	NM (Nitromethane) CH_3NO_2	NE (Nitroethane) $CH_3CH_2NO_2$	1-NP (1-Nitropropane) $CH_3CH_2CH_2NO_2$	2-NP (2-Nitropropane) $CH_3CHNO_2CH_3$
Molecular Weight	61.04	75.07	89.09	89.09
Boiling Point at 760mm, °C	101.2	114.0	131.6	120.3
Azeotrope with Water, bp, °C	83.6	87.1	91.2	88.4
NP in azeotrope, % by weight	77.1	73.6	64.5	73.1
Vapor Pressure at 20°C, mm	27.8	15.6	7.5	12.9
Evaporation Rate, by volume*	139.0	121.0	88.0	110.0
Freezing Point, °C	−29.0	−90.0	−108.0	−93.0
Specific Gravity at 20/20°C	1.139	1.052	1.003	0.992
Density of Vapors (air = 1.00)	2.11	2.58	3.06	3.06
Weight per U.S. Gallon at 68°F, lb	9.48	8.75	8.35	8.24
Coefficient of Expansion, per °F	0.00064	0.00062	0.00056	0.00058
Refractive Index, n_D at 20°C	1.3818	1.3916	1.4015	1.3941
Surface Tension at 20°C, dynes/cm	37.0	31.3	30.0	30.0
Heat of Vaporization at 30°C, calc., cal/g	143.3	124.8	107.3	104.4
Heat Capacity at 25°C, cal/g	0.422 30°C	0.441	0.471	—
Dielectric Constant at 30°C	35.76	28.00	23.22	25.48
Ignition Temperature, °F	785.0	778.0	789.0	802.0
Flash Point, °F (Tag Open Cup)	112.0	106.0	120.0	103.0
pH 0.01M Aqueous Solution at 25°C	6.4	6.0	6.0	6.2
Solubility in Water at 20°C, % by volume	9.5	4.5	1.4	1.7
Solubility of Water in NP at 20°C, % by volume	2.2	0.9	0.5	0.6

*N-Butyl Acetate = 100

NP DERIVATIVES ALSO AVAILABLE

AB (2-Amino-1-butanol)
AEPD (2-Amino-2-ethyl-1, 3-propanediol)
AMPD (2-Amino-2-methyl-1, 3-propanediol)
AMP (2-Amino-2-methyl-1-propanol)
NB (2-Nitro-1-butanol)
NEPD (2-Nitro-2-ethyl-1, 3-propanediol)
NMPD (2-Nitro-2-methyl-1, 3-propanediol)
NMP (2-Nitro-2-methyl-1-propanol)

ALKATERGES
TRIS AMINO (Tris [hydroxymethyl] aminomethane)
TRIS NITRO (Tris [hydroxymethyl] nitromethane)
HAS (Hydroxylammonium Acid Sulfate)
HC (Hydroxylammonium Chloride)
HS (Hydroxylammonium Sulfate)

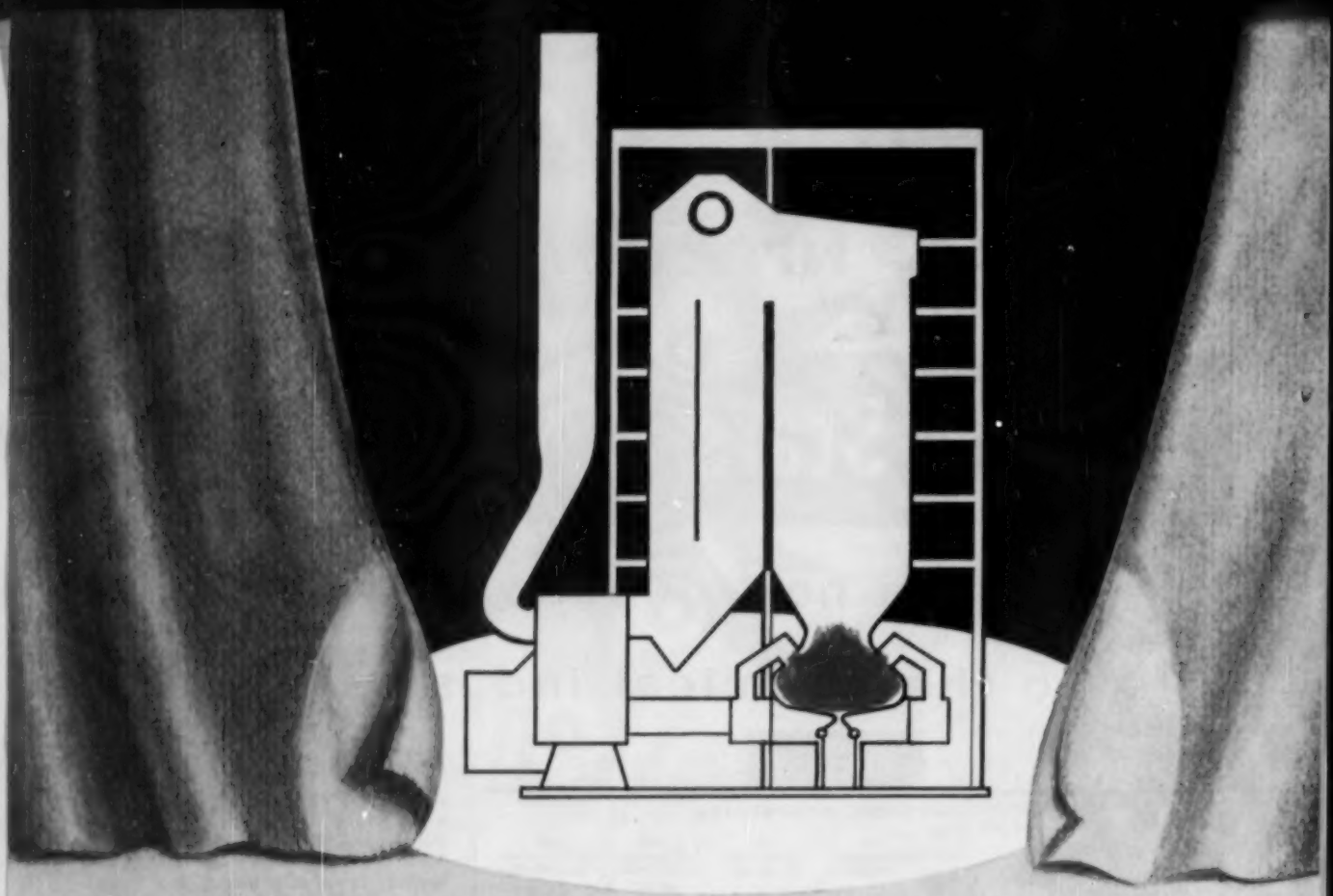
SAMPLES ON REQUEST

Here are the Nitroparaffins – NM(Nitromethane), NE(Nitroethane), 1-NP(1-Nitropropane) and 2-NP(2-Nitropropane). These four NP's have a potential range of usefulness unequalled by any other group of organic chemicals! CSC's new Nitroparaffin plant at Sterlington, La. is now in full production. Additional facilities for increased volume of NP derivatives are nearing completion.

In many cases, they provide better and more economical methods of manufacturing well-known and widely used industrial chemicals. However, the majority of the reactions yield entirely new compounds. There is practically an unlimited number of products which can be prepared from the NP's. As solvents, they present an unusual combination of properties – they are medium-boiling, mild-odored and, most important of all, they have strong solvent power for a wide variety of substances, including many coating materials, waxes, resins, gums, dyes, fats and oils, and numerous organic chemicals. The CSC Nitroparaffins are chemistry's newest stars. They give new direction to the production of old products and the development of new.

COMMERCIAL SOLVENTS CORPORATION
260 MADISON AVENUE NEW YORK, N. Y.

CSC INDUSTRIAL CHEMICALS



Efficiently uses a wide range of coals . . . oil

With these outstanding advantages:

- No slag blowers required
- Higher efficiency — lower carbon loss
- No stratification of furnace gases
- All burners on one level
- No flyash disposal problem
- The same temperature of gases leaving furnace with any fuel
- No conversion of pressure parts required for change of fuel
- Lower overall height

...gas...lignite...delayed coke...fluid coke

A survey of your plant by a consulting engineer could show ways of making surprising savings in your power costs.

RILEY
Stoker Corporation
WORCESTER, MASSACHUSETTS

Sales Offices: Worcester, New York, Philadelphia, Buffalo, Washington, Pittsburgh, Cleveland, Detroit, Chicago, Cincinnati, Charlotte, New Orleans, Atlanta, St. Louis, Kansas City, St. Paul, Houston, Denver, Salt Lake City, Los Angeles, San Francisco, Portland, Seattle.

UNITS WITH RILEY TURBO FURNACES ARE DESIGNED FOR ANY CAPACITY, PRESSURE, TEMPERATURE

A Few Turbo Furnace Units

ST. CROIX PAPER CO.
One 175,000 lb./hr. Unit, 750 psig, 725F.

CARBIDE & CARBON CHEMICALS CO.
One 175,000 lbs./hr. Unit, 450 psig, 515F.
One 289,000 lbs./hr. Unit, 650 psig, 660F.

DELAWARE POWER & LIGHT CO.
Three 500,000 lbs./hr. Units, 1425 psig, 950F.

TEXAS ELECTRIC SERVICE CO.
One 825,000 lbs./hr. Reheat Unit, 1750 psig, 1005/1005F.

LOUISIANA POWER & LIGHT CO.
One 1,550,000 lbs./hr. Reheat Unit, 2125 psig, 1005/1005F.

WHERE TO GET IT *And How to Do It*

-INDEX OF HELPFUL BOOKLETS, BULLETINS, REFERENCE LITERATURE-

Cooperating with leading manufacturers of equipment and supplies, SPI makes available for the asking without cost or obligation, the following valuable bulletins, booklets, handbooks and catalogs.

Check the list, fill in Coupon, mail to SOUTHERN POWER & INDUSTRY. (Coupon Post Cards on pages 17 and 18.) This service restricted to those interested in the operation or design of Industrial, Power and Service Plants.

STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

5 **CONTINUOUS BLOWOFF**—Bulletin—Describes how stainless steel rotary disc valve offers 16 calibrated orifices to provide any rate of flow. Sediment chamber protects orifices from plugging. No moving parts to wear out or leak. Read how to cure blow-off problems and save on fuel.—THE UNIBLOW VALVE COMPANY.

6 **PACKAGED PLANTS** — Catalog 711 describes how steam at point of use cuts costs for process industries. Packaged generators are fully automatic, burning oil, gas, or both in combination. Eighteen sizes from 20 to 600 bhp and for pressures to 250 psi.—SUPERIOR COMBUSTION INDUSTRIES.

21 **WHAT TYPE COLLECTOR?**—Reprint 102 shows how various industrial dust and flyash problems are being solved.—THERMIX CORPORATION.

29 **CONTINUOUS BLOW-OFF**—Bulletin, 8 pages—Gives the basic facts about boiler blow-off, and describes the Madden system of control of continuous blow-off for the removal of solids and impurities from steam releasing surfaces.—THE MADDEN CORPORATION.

37 **STEAM BOILERS**—Bulletin SB-50, 16 pages—Describes and illustrates complete line of steam generating equipment, with sectional views, diagrams, plant applications. Condensed reference material for consulting and power engineers.—ERIE CITY IRON WORKS.

56 **WATER TUBE BOILERS**—Booklet—Describes details of stoker—oil or gas or combination gas/oil, 10 to 250 hp to 250 psi; designed for easy conversion to any fuel.—QUEEN CITY ENGINEERING COMPANY, INC.

76 **GAS BURNER** — Bulletin — Describes the Rectilinear gas burner, an application of the venturi principle which provides high input through narrow rectangular openings for firing — in a horizontal plane through fire doors or small openings over handfired coal grates or stokers — or for firing in a vertical plane on either side of stoker or oil burner.—THE WEBSTER ENGINEERING COMPANY.

78 **TANDEM COMBUSTION UNITS**—Catalog 50—Describes National Airoil tandem combustion units for high combustion efficiency, using gas or oil fuel, applicable to all types of boilers and process furnaces.—NATIONAL AIROIL BURNER CO., INC.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

101 **BOILER FEED PUMPS**—Bulletins 230, 241, 244, 246—Two, four and six stage feed pumps, covering pressure ranges from 250 to 1200 psi—also horizontal duplex piston pumps in 250-400 psi range.—WARREN STEAM PUMP CO.

103 **PUMPS** — What Is NPSH — This technical article by D. R. Rankine, Chief Engineer of Peerless, is an excellent treatise on this widely used but greatly misunderstood term. — PEERLESS PUMP DIVISION, FOOD MACHINERY & CHEMICAL CORP.

112 **INDUSTRIAL FANS**—Bulletin 702—Describes the new Clarage Type XL fans for industrial air and material handling. Covers entire size range — 11" through 60" inlet diameters, pressures up to 18" SP, volumes to 130,000 cfm.—CLARAGE FAN COMPANY.

114 **CENTRIFUGAL COMPRESSORS**—Bulletin 109—Describes single stage centrifugal compressors from 30 to 600 hp and pressures from 1¼ to 3¾ pounds pressure. Their functions, applications, ratings, construction features and arrangement are presented.—AMERICAN BLOWER CORPORATION.

116 **MOTOR PUMPS FOR BULK STATION SERVICE**—Form 7251—Describes and illustrates this unit in its various applications with cross-sectional views and engineering data.—INGERSOLL-RAND CO.

120 **CONTINUOUS BLOW-OFF SYSTEM**—Publication 4681—The savings possible through continuous blow-off as applied in many modern boiler plants.—COCHRANE CORP.

128 **HOW TO SOLVE PUMPING PROBLEMS**—Booklet, 36 pages—Explains the functions and characteristics of Rotary gear pumps; sample application problems with charts and curves on pipe friction losses, viscosity conversion tables, materials of construction for various liquids, and additional information pertaining to pump applications.—GEO. D. ROPER CORPORATION.

167 **ROTARY PUMPS** — Bulletin 307 — Describes the features and advantages, and outlines the engineering details of Blackmer rotary pumps. These have been manufactured since 1904 and incorporate the outstanding advantages of "automatic adjustment for wear," and economical replacement of parts.—BLACKMER PUMP CO.

170 **HEAT EXCHANGERS** — Bulletins 120 & 124 describe Aero units which cool liquids and gases by evaporative cooling with atmospheric air, removing heat at rate of input, and precisely controlling temperature. Solves problems of water availability, quality or temperature.—NIAGARA BLOWER CO.

196 **INDUSTRIAL HEATERS** — Bulletin RC-10-53—Describes the Thermobloc heat machine producing heat in any desired quantity and placing it where needed—an independent unit heater using the economical principles of direct heat transfer—low cost, automatic operation, tempered air, ease of installation, complete range of sizes from 100,000 Btu per hour to 1,000,000 Btu per hour.—PRAT-DANIEL CORP., THERMOBLOC DIV.

INSTRUMENTS—METERS CONTROLS—REGULATORS

202 **ORIFICE FLOW METERS**—Bulletin, 8 pages — Describes orifice meters used for the control of continuous blow-off of boilers, and of similar solids removal from steam and gas releasing surfaces, available in pressures up to 650 psi.—THE MADDEN CORPORATION.

209 **LIQUID LEVEL CONTROL**—Catalog — Describes Magnetrol liquid level control in which a sleeve, raised and lowered with a non-magnetic tube, attracts or releases an Alnico magnet attached to a mercury switch. Standard model can be easily adapted to meet any special requirement for pressure, temperature or corrosive liquid. Units available for controlling level changes from .0025-in. to 150-ft, with multistage switching when desired.—MAGNETROL, INC.

220 **DIAL THERMOMETERS**—Bulletin 255 describes a complete line of easy-to-read, vapor-pressure-actuated dial thermometers, available with rigid stem for use in pipe lines and tanks, or with flexible tubing for conveniently determining temperature at a point some distance from dial.—THE POWERS REGULATOR CO.

228 **GAUGE ILLUMINATOR** — Supplement ML—Describes a high power mercury lamp in special housing to fit back of water gauge inserts, to increase visibility of water level reading. — RELIANCE GAUGE COLUMN CO.

233 **CONTROL DRIVES** — Product Specification P31-1 — Provides description, illustrations, ordering information, torque ranges, and dimensions of Bailey control drives for the positioning of regulating devices such as dampers, butterfly valves, rheostats. Actuated by pneumatic signals from automatic or remote manual control.—BAILEY METER COMPANY.

237 **GLASS SPECIALTIES** — Bulletin 10-1-51—Describes Ernst glass specialties—gage glasses, tubing, discs, plates, edge glasses, cutters, etc.—ERNST WATER COLUMN & GAGE CO.

246 **DRAIN OR SAMPLING VALVE**—Data Sheet No. 270, 1 page—Describes and illustrates the company's No. 33 valve which has the valve stem seating on the outside of the valve body making it completely self-draining. Features covered include outside screw and yoke construction, recommended pressures and materials.—JERGUSON GAGE & VALVE CO.

257 **AUTOMATIC STEAM PRESSURE CONTROL**—Bulletin 463—Describes the Leslie pressure controller for supplying intermittent make-up to a low pressure system from a high pressure line—positive, faithful.—LESLIE COMPANY.

277 **WATER COLUMNS AND GAGES**—Bulletin WG-1811—Describes Hi-Lo alarm water column with vertical or "Sesure" inclined water gages. Complete details as to design, application and maintenance, with illustrations, and listing of applications.—YARNALL-WARING CO.

290 **PROCESS TROUBLESHOOTER**—Bulletin 6-A describes the Panalarm Visual Sequence Annunciator, which flashes cause of trouble, resultant off-normals, and provides means of grouping and acknowledging related variables so that minimum interpretation is required.—PANELLIT, INC.

PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

305 **INDUSTRIAL HEATING**—Catalog 55, 50 pages—Gives data on the type and size of electric heating units and similar equipment for industrial heating needs. Detailed diagrams and photographs describe applications.—EDWIN L. WIEGAND CO.

318 **WROUGHT IRON** — "ABCs of Wrought Iron"—A concise digest of more detailed technical handbook material on wrought iron—describes resistance to corrosion, fabrication process—where needed—shock and vibration endurance.—A. M. BYERS.

328 **WELDING STAINLESS STEEL**—52 page Booklet contains valuable data on the welding, brazing, soldering and hot cutting of stainless steel.—WAREHOUSE DIVISION, ATLANTIC STEEL COMPANY.

334 **CHEMICAL AND PROCESS PLANT EQUIPMENT**—Catalog 133—Gives application details and installation views of a broad variety of equipment such as air compressors, vacuum pumps, blowers, ejectors, condensers, engines, pumps, air tools for general use.—INGERSOLL-RAND CO.

352 **ELECTRIC PRECIPITATORS** — Booklet — Describes the various types and applications of Cottrell electrical precipitators for the collection of solid and liquid matter suspended in hot or cold gases, with complete engineering data and illustrations.—WESTERN PRECIPITATION CORP.

366 **INDUSTRIAL HEATERS**—Bulletin RC-10-55 — Describes the Thermobloc heat producing machine producing heat in any desired quantity and placing it where needed—an independent unit heater using the economical principles of direct heat transfer—low cost, automatic operation, tempered air, ease of installation, complete range of sizes from 100,000 Btu per hour to 1,000,000 Btu per hour.—PRAT-DANIEL CORP., THERMOBLOC DIV.

370 **WELDING ROD GUIDE**—32 page DirecteRod Guide helps you select from 140 rods those that will give you the largest savings per job, whether production, maintenance or salvage.—EUTECTIC WELDING ALLOYS CORP.

387 **CHEMICAL FEEDERS** — Bulletin 40TS—Describes Series 5D feeders for use on boiler feedwater pumps and in similar applications. Several models and types of drive are shown.—MANZEL DIVISION OF FRONTIER INDUSTRIES, INC.

PIPING, VALVES, FITTINGS STEAM SPECIALTIES, TRAPS

400 **CONTINUOUS BLOW-OFF VALVES**—Bulletin—Describes the Uniblow complete blow-off unit, with continuous blow-off valve, sediment chamber, clean-out valve, by-pass line. This unit features stainless steel rotary disc valves which offer 35 calibrated orifices to provide any rate of flow—saving on fuel, and giving continuous good service, without moving parts to wear out or leak.—THE UNIBLOW VALVE COMPANY.

FREE Reader SERVICE

Use These Handy Return Cards ▶

- **Circle Code Numbers of Catalogs You Want**
- **Fill in Your Name, Position and Company**
- **Tear Out and Mail Today! No Postage Necessary**

Please be sure to fill in your Firm's Name and your position on the Coupon. This service cannot be extended to you unless this information is furnished.

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 582, SEC. 34.9, P. L. & R., ATLANTA, GA.

Equipment and Review Editor
SOUTHERN POWER AND INDUSTRY
806 Peachtree St., N. E.
Atlanta 5, Ga.

Please send me without obligation, free booklets described in the December 1955, issue of SOUTHERN POWER AND INDUSTRY as circled below.

5	6	21	29	37	56	76	78	101	103	112	114	116
120	128	167	170	196	202	209	220	228	233	237	246	267
277	290	305	318	328	334	352	366	370	387	400	403	404
410	425	436	464	465	463	471	483	486	518	521	522	548
594	595	608	610	619	620	621	626	633	676	703	704	708
712	714	718	764	805	820	828	941	861	864	866	871	908
922	926	927	936	937	969	X-1	X-2	X-3	X-4	X-5	X-6	X-7
X-8	X-9	X-10	X-11	X-12	X-13	X-14	X-15	X-16	X-17	X-18	X-19	X-20
X-21	X-22											

Also send further information on following New Equipment (page 94).

Z-1	Z-2	Z-3	Z-4	Z-5	Z-6	Z-7	Z-8	Z-9	Z-10	Z-11	Z-12	Z-13
Z-14	Z-15	Z-16										

Name ..... Position .....

Company Name .....

Street .....

City ..... Zone ..... State .....

403 **VALVE OPERATORS, SPROCKET RIMS**—Bulletin SR—Describes and illustrates adjustable sprocket rims with chain guides, and other forms of Babbitt valve operators and controls.—BABBITT STEAM SPECIALTY CO.

404 **MALLEABLE PIPE UNIONS AND SPECIALS** — Catalog — Describes unions, union elbows, union tees, union flanges—with ground joint brass or all-iron seats. 300-lb, 250-lb and 150-lb pressures. AAE unions.—JEFFERSON UNION CO.

410 **PIPE HANGERS**—Bulletin 183, 12 pages—Describes National counterpoise pipe hangers for high temperature piping systems in steam plants, refineries, chemical plants, and the like. Graphs give aid in selection. Dimensions, erection and field adjustment instructions. Illustrations of typical installations.—NATIONAL VALVE & MANUFACTURING COMPANY.

425 **THERMODYNAMIC STEAM TRAP** —Bulletin 255-44—Describes simple low maintenance steam trap which features no valve-closing mechanisms to wear or stick, no critical clearances to choke, and no gaskets to leak. Only moving part is a solid stainless steel disc. Same trap for all loads and pressures 10-600 psi. Operates against back pressures up to 80% of inlet pressure. —SARCO COMPANY, INC.

435 **VESSEL INSULATION** — Bulletin 541 gives specifications for Coprfibre blanket insulation and metal jacketing. Low initial cost; higher insulating efficiency; and less repair at lower cost.—FORTY-EIGHT INSULATIONS, INC.

454 **WROUGHT IRON FOR PIPING SYSTEMS**—Bulletin—Gives a fund of helpful information on piping materials and their selection; corrosive conditions in water, drainage and heating systems, and methods for reducing the severity of corrosion.—A. M. BYERS COMPANY.

455 **PLASTIC VALVES AND FITTINGS** —Brochure covers company's extensive line of new corrosion-resistant valves and pipe fittings molded from rigid polyvinyl chloride.—WALWORTH COMPANY.

463 **JACKETED VALVES** — Bulletins 220 and 221—Describe operational features of jacketed valves for gages or wherever small jacketed angle valves are required. Full specifications, cutaway views, applications.—JERGUSON GAGE & VALVE COMPANY.

471 **COMPOUND STEAM TRAPS**—Bulletin No. 215, 8 pages—Discusses purpose, operation, physical data, installation of super-capacity steam traps for draining purifiers, separators, water heaters, etc. Capacities to 300,000 lb/hr.—ARMSTRONG MACHINE WORKS.

483 **UNIONS & SWING CHECKS**—Catalog 11, 24 pages—Gives engineering data and specifications on a complete line of hot forged steel pipe unions and swing check valves. Special section devoted to Double-Start Unions, which provide faster opening and closing.—CATAWISSA VALVE & FITTINGS COMPANY.

486 **BRONZE GATE VALVES**—Bulletin V-260—Gives the general specifications of standard bronze gate valves including solder-end and brazed-end valves. Construction features are illustrated with the 300 lb union bonnet gate valve.—THE FAIRBANKS COMPANY.

MAINTENANCE PACKING GASKETS, LUBRICATION

518 **PACKINGS & GASKET CUTTERS** — Catalog, 50 pages — Describes "The Packing That Packs All," manufactured in a variety of forms such as coil spool, loose, rings, sets, spiral, and sheet. Designates materials available. Covers gasket cutters and related items. Illustrated with photographs and drawings.—THE ALLPAX COMPANY, INC.

521 **WELDING AND FLAME CUTTING OF WROUGHT IRON**—Bulletin—Gives complete information on the processes and procedures used in welding wrought iron, and flame cutting wrought iron. A complete information on physical properties of wrought iron welds. Additional section on Flame Descaling.—A. M. BYERS CO.

522 **CHEMICAL WELL CLEANING**—Booklet, 10 pages—Describes the technical aspects of water well acidising and cleaning—range and limitations, choice of reagents, recent developments in techniques. —DOWELL, INC.

548 **FILTRATION SYSTEM** — Bulletin FA-46A, 8 pages—Describes Sorbo-Cel, a specially treated Celite diatomite filter aid which removes emulsified oil from condensate or process water. Describes types of filters used and includes step by step directions on operation of a filtration system. Case histories, illustration.—JOHNS-MANVILLE, INC.

594 **CORROSION CONTROL** — Booklet, 36 pages — "Corrosion Control of Electric Light and Power Structures and Equipment"—is designed to give company field operating men practical painting information on all phases of transmission and distribution work. Applicational photographs. —SUBOX, INC.

595 **PLANT LUBRICATION**—The Lubriplate Service Handbook—Gives valuable information on the subject of lubrication in all its forms, intended to be of everyday use to plant superintendents, managers, maintenance engineers and those in charge of plant production and maintenance.—LUBRIPLATE DIVISION, FISKE BROTHERS REFINING CO.

ENGINES, DRIVES POWER TRANSMISSION MATERIALS HANDLING

608 **BELT REPAIRS**—Folder R4 describes "REMA" the self-vulcanizing rubber repair material which requires no heat, no heavy equipment, and no curing time delay. It's vulcanization by chemical process. Belts may be returned to service immediately. — FLEXIBLE STEEL LACING CO.

610 **COAL HANDLING SYSTEM** — Bulletin 140 describes the Redler system affording dustless coal handling, low operating costs, and location flexibility. —STEPHENS-ADAMSON MFG. CO.

Please send me without obligation, free booklets described in the December 1955, issue of SOUTHERN POWER AND INDUSTRY as circled below.

5	6	21	29	37	56	76	78	101	103	112	114	116
120	128	147	170	196	202	209	220	228	233	237	246	257
277	290	305	318	328	334	352	366	370	387	400	403	404
410	425	435	454	455	463	471	483	486	518	521	522	548
594	595	608	610	619	620	621	626	633	676	703	704	708
712	714	718	764	805	820	828	841	861	864	866	871	908
922	926	927	936	937	969	X-1	X-2	X-3	X-4	X-5	X-6	X-7
X-8	X-9	X-10	X-11	X-12	X-13	X-14	X-15	X-16	X-17	X-18	X-19	X-20
X-21	X-22											

Also send further information on following New Equipment (page 94).

Z-1	Z-2	Z-3	Z-4	Z-5	Z-6	Z-7	Z-8	Z-9	Z-10	Z-11	Z-12	Z-13
Z-14	Z-15	Z-16										

Name ..... Position .....

Company Name .....

Street .....

City ..... Zone..... State .....

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 582, SEC. 34.9, P. L. & R., ATLANTA, GA.

Equipment and Review Editor
SOUTHERN POWER AND INDUSTRY
806 Peachtree St., N. E.
Atlanta 5, Ga.

619 **WOVEN WIRE SLINGS** — Illustrated handbook shows construction details of gripper woven wire slings, with views showing how such slings are used for both production work and general materials handling.—THE CAMBRIDGE WIRE CLOTH CO.

620 **DOUBLE PITCH CONVEYOR AND POWER TRANSMISSION CHAINS** —Catalog No. 24, 30 pages—Describes American Standard stock chains having figure 8 contour links, and chain pitch twice that of corresponding American Standard roller chains.—DIAMOND CHAIN COMPANY, INC.

621 **POWER TRANSMISSION AND EQUIPMENT** — Catalog 49 — Gives comprehensive details of a complete line of power transmission including V-Belt drives, flat belt drives, pulleys, gears, chains, sprockets.—Industrial Division of CONTINENTAL GIN CO.

626 **MATERIALS HANDLING VALVES** —Data Sheet DVa covers new self-feeding, non-plugging valves which give trouble-free flow control in pneumatic transport or fly ash and other fine solid materials. Designed for air-electric remote and manual operation. — ALLEN-SHERMAN-HOFF.

633 **DISPATCH SYSTEMS** — Bulletin AD-1—Illustrates complete range of overhead carriers equipped for automatic transfer and dispatch of materials under varying conditions in various industries.—AMERICAN MONORAIL CO.

676 **VARIABLE SPEED CONTROL**—Catalog No. 209, 20 pages—Describes the Sterling Speed-Trol which gives variable speed control necessary for equipment adaptation; process control of temperature, viscosity, level, pressure, flow, etc.; time control of baking, drying, heating, cooking, pasteurizing, soaking, chemical action, etc.—STERLING ELECTRIC MOTORS.

WATER TREATMENT, HEATING, VENTILATING, AIR CONDITIONING REFRIGERATION, DUST & FUME CONTROL

703 **AIR CONDITIONING** — Bulletins 112 & 123 describe "controlled humidity" method where cooling and heating functions are made completely separate from adding or taking away moisture. No moisture sensitive instruments needed in flexible and compact design.—NIAGARA BLOWER CO.

704 **WATER CONDITIONING** — Brochure describes company's engineering services—zeolite water softeners, filters and purifiers, modernized and rebuilt water softeners, aerators and degasitors and process and boiler water conditioning.—SOUTHERN WATER CONDITIONING, INC.

708 **COOLING TOWER DRIVES**—Catalog CT-53 — Gives information on the use of gear reduction drives for cooling tower applications — includes worm gear units, spiral-bevel units and helical-spiral-bevel units. Gives construction and operating details, with illustrations and selection data. —PHILADELPHIA GEAR WORKS.

712 **ION EXCHANGE EQUIPMENT**—Bulletin A-255 describes the various methods of ion exchange treatment which provide suitable boiler feedwater, process water, and purified solutions.—ILLINOIS WATER TREATMENT CO.

714 **INFRA-RED UNIT HEATERS**—Bulletin P-154—Describes "Panelbloc" infra-red unit heaters available in 62,500 btu and 125,000 btu input. No fan, motor, or electrical connection is needed. Heating is accomplished by guided radiation. The units may be used with any commercial type gas fuel. THERMOBLOC DIVISION OF PHAT-DANIEL CORPORATION.

718 **ZEOLITH SOFTENERS**—Bulletin—Gives complete details on Cochrane Zeolite softeners and the Cochrane hydromatic valve which gives automatic operation, a four position valve for service, backwash, brine, rinse and two stand-by positions.—COCHRANE CORP.

764 **REFRIGERATION CENTERS**—Bulletin 125-A—Show the varied services a community ice plant and refrigeration center can provide including quick freezing, cold storage lockers, cold storage. —FRICK COMPANY.

ELECTRICAL

805 **POWER FACTOR CORRECTION** —28 page catalog shows how you can cut power costs by installing correction capacitors on motors and other inductive electrical equipment. Greater loads can be handled from existing circuits. Wiring, transformer and switchgear costs can be greatly minimized in new installations.—SPRAGUE ELECTRIC CO.

820 **MOTOR CONTROL UNITS**—Bulletin 500-T—Describes oil tight solenoid motor controlled units for machine tools and similar equipment with various accessory equipment to fit the particular job.—ALLEN-BRADLEY CO.

828 **ELECTRIC POWER DRIVES**—Application Tabloid Bulletin, 8 pages —Presents photographs and application stories of Sterling Electric power drives on machinery and equipment in food, metal, chemical, petroleum and plastic industries, in paper, lumber and textile plants.—STERLING ELECTRIC MOTORS, INC.

841 **APPLYING ELECTRIC HEAT** — "101 Ways to Apply Electric Heat" —Gives illustrated case histories showing experience-tested methods of applying Chromalox electric heating elements. Physical aspects of installation are shown along with the description of the problem, solution and advantages obtained.—EDWIN L. WIEGAND CO.

861 **ELECTRICAL PROTECTION SYSTEM** — Bulletin HCS—Describes "Fusetron" dual-element fuses which save recalibration and maintenance costs. Eliminates down-periods caused by needless blows and saves on installation costs. Available in all sizes from 1/10 to 600 amperes, both 250 and 600 volt types. Also in plug types for 125 volt circuits.—BUSSMANN MANUFACTURING COMPANY.

KEEP UP-TO-DATE

- Ideas
- Methods
- Equipment

USE SPI READER SERVICE

See Service Card on Opposite Page

864 **ELECTRICAL SYSTEM PLANNING** —Book C-87—"Power Up," 51 page book on electrical system planning, maintenance and modernization for industrial plants. Important sections on installation and maintenance of industrial electrical distribution systems; wire cable and conduit data; motor application data; and electrical systems reference data.—ANACONDA WIRE & CABLE CO.

866 **HIGH VOLTAGE SWITCHGEAR**—Bulletin 7004-B, 24 pages—Switchgear components, applications, specifications and construction data. Illustrated with photographs, diagrams and charts.—I-T-E CIRCUIT BREAKER CO.

871 **ELECTRICAL PROTECTION**—Protection Handbook — Tells how to protect motors, apparatus and circuits. Gives National Electrical Code requirements in simplified form. Designed to help the electrical or plant maintenance engineer.—BUSSMANN MFG. CO.

MISCELLANEOUS . . . SAFETY, BUILDING EQUIPMENT, METALS

908 **TRANSLUCENT FIBERGLASS PANELS**—Data sheet shows how shatterproof panels end pane replacement. Ideal for glazing factory windows where pane breakage is high. Panes are unaffected by weather extremes or usual industrial fumes. Panels transmit almost as much light as clear glass.—RESOLITE CORP.

922 **INDUSTRIAL INSULATION** — Descriptive Catalog A-91 contains data on application, coverage, usages and advantages of industrial insulating cements, blocks, blankets, felts, fill materials, pipe coverings, protective coverings, anti-condensation compounds and fireproofing cement—for temperatures from sub-zero to 2300 degrees F.—EAGLE PICHER CO.

926 **SIMPLIFIED FENCE PAINTING**—Bulletin—Describes complete paint system where a single coat gives an excellent and lasting job. Bubalox metallics simulate the appearance of galvanizing. Old fences can be given a "new look" which can be easily maintained with a minimum of time, labor and material cost.—BUBOX, INC.

927 **FLOOR GRATING** — Catalog No. AT254—Describes company's free planning and checking service for completely custom fabricated floor grating installations.—BORDEN METAL PRODUCTS CO.

936 **STOCK & WEIGHT HANDBOOK**—84 pages. Gives complete information on all sizes and shapes of stainless and carbon steel products normally carried by steel warehouses. Useful charts and tables.—WAREHOUSE DIVISION, ATLANTIC STEEL COMPANY.

937 **STEEL MEASURING TAPES** — Complete catalog describes full line of measuring tapes from 6 to 100 ft., including wide blade tape with upright measurements.—EVANS RULE CO.

969 **INSULATING BRICK** — Brochure IN-115A—Describes the construction, application and use of insulating firebrick, including insulating brick, hydraulic-setting refractories, aggregates and fills—for service temperatures up to 3000 F.—JOHNS-MANVILLE CORP.

More Catalogs—Page 112

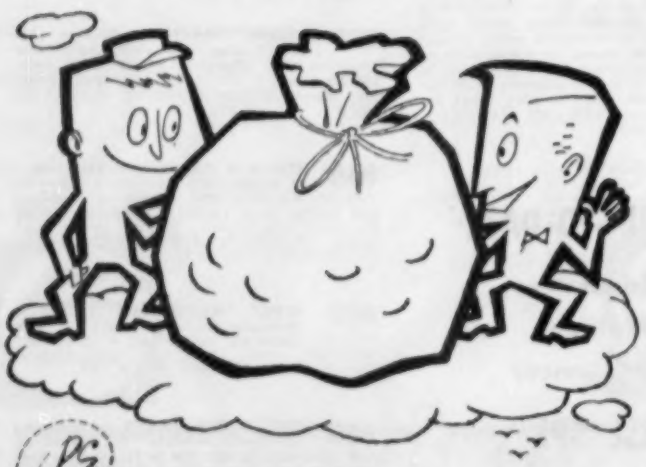
New Equipment — Page 94

Are those all the ashes for the day?

That's all! We're using a low-ash coal now. The analysis shows only one-half as much ash as the coal we had been using, and there is a great deal less unconsumed coke on the refuse.

But don't we have to pay more for this kind of coal?

Yes, we may pay more at the mine, but it costs us less delivered. Remember we used to pay freight on all those ashes and then pay to haul them away. And because there is so much more usable coal in each ton, we use fewer tons.



Who showed us how to make this saving?

A C&O fuel service engineer gave us the facts and figures to show that this higher quality coal would really cost us less in the long run, and our experience has proved he was right. I am convinced now that you can't buy coal on price alone. It pays to get the advice of a competent combustion engineer and to pick the coal that will do the best job under your own set of conditions.

P.S.

There's a lot more to buying coal than the cost per ton. Why not contact coal producers on the C&O to solve your particular fuel requirements, or write to: R. C. Riedinger, General Coal Traffic Manager, Chesapeake and Ohio Railway Company, Terminal Tower, Cleveland 1, Ohio.

Chesapeake and Ohio Railway

WORLD'S LARGEST CARRIER OF BITUMINOUS COAL

Reichhold Chemicals, Inc. *Saves Money with QC BOILER!*

REICHHOLD CHEMICALS, INC. Charlotte, N. C.

Cost of produced steam reduced by 15 to 20%!

The installation of a 10,000 lbs/steam/hr Queen City "bent tube" water tube boiler is a real money-saver for Reichhold.

Cost of steam is reduced 15 to 20% which represents a saving of hundreds of dollars monthly. These savings, **plus** the continuous steam pressure maintained by the QC boiler under rapid and extreme fluctuating loads guarantees economical plant operation.

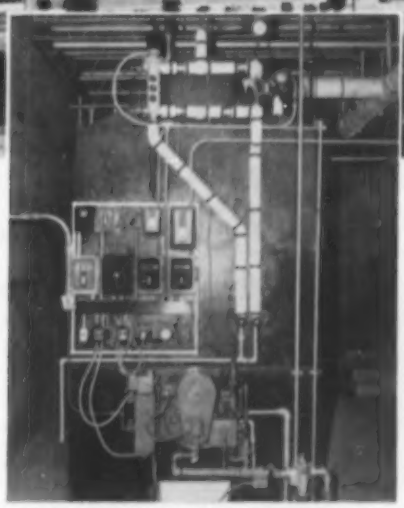
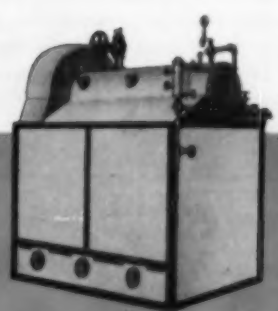


Photo shows front panel of boiler installation.

The Reichhold installation is combination gas and oil fired, with a **30-second push-button changeover!** Coal, gas, oil or combination gas/oil firing units from 300 to 15,000 lbs/steam/hr, up to 250 psi.

For **more** steam, faster and drier, at less cost, install a QC water tube boiler in your plant.



For complete information, write

Queen City Engineering Co.

P. O. BOX 3103, CHARLOTTE, NORTH CAROLINA

Picture of a Natural Gas Burner Maintenance Crew

No . . . the printer didn't forget to put in the picture. This is just our way of dramatizing the fact that natural gas burners require virtually NO maintenance.

They don't present a big replacement problem either. Many industrial natural gas burners have been doing an efficient job for a quarter century.

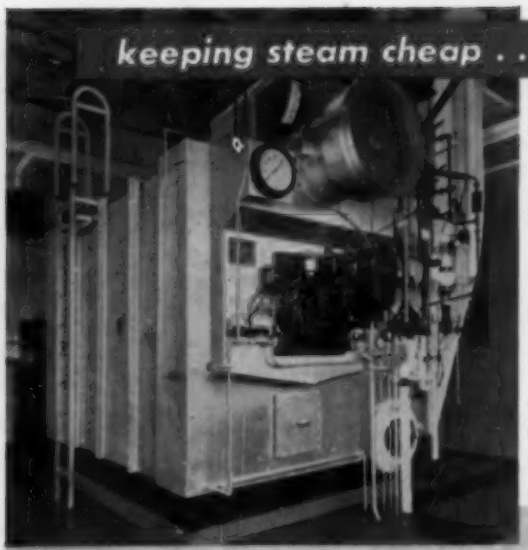
Nor do natural gas users have to worry with complicated processing machinery to handle the fuel and prepare it for use. Natural gas comes ready to go to work.

So . . . if maintenance and replacement costs have been red-inking your budget, there may be a money saving thought here for you.

SOUTHERN NATURAL GAS COMPANY

Serving the Growing South

WATTS BUILDING • BIRMINGHAM, ALA.



B&W Integral-Furnace, Type FM Unit which supplies steam for all plant purposes.

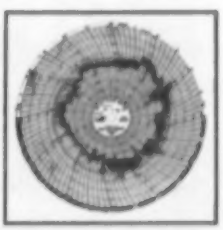
Main plant building of Shulton, Inc.

Engineers: Emil Greenberg & Associates, N. Y. C.
Architects: Drake, Tuthill, Convery & Cueman Associates Summit, N. J.

B&W FM Boiler Supplies NEW STEAM FOR *Old Spice*

Production lines are humming at the beautiful Shulton, Inc., plant in Clifton, New Jersey, as this leading toiletries manufacturer hustles to keep pace with the huge and growing demand for its *Old Spice* and other lines of popular products. Started from scratch less than 20 years ago, Shulton, Inc., now makes its own dies, boxes, packages, and plastic closures for the toiletries which today sell in 28 countries and the United States.

Production on this scale requires a reliable source of economical steam for heating, hot water, and processing operations in the plant's chemical and packaging divisions. When maintenance costs on the two original boilers at the plant began to rise, a B&W FM Unit to provide 15,000 lb of steam per hr at a pressure of 150 psi was installed and went into service last February. The unit burns up to 1600 gallons of #5 oil in 24 hrs., depending upon load. With a return as high as 75%, makeup water required runs between 25 and 50%. Mr. N. J. Fowler, Plant Engineer in charge of Shulton's Clifton operation, declared that "the FM handles wide load swings extremely well and everyone concerned is very happy with the new boiler."



Like *Old Spice*, B&W FM Boilers are quality products. They have earned a reputation for efficient, economical steam generation for power, processing, and heating in a broad range of industrial, commercial, and institutional applications. Available in standard sizes with individual capacities to 40,000 lb of steam per hr and pressures to 235 psi, many FMs are in service at higher pressures and with moderate superheat. Note the list of cost-saving features typical of this versatile unit.

Write for the detailed description of the FM in Bulletin G-76. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

G-729

COST-SAVING FEATURES

- Saves Erection Time and Cost
- Meets Wide Range of Service
- Handles Quick Load Changes
- Suitable for Outdoor Service
- Safe, Automatic Operation
- Fast Steaming
- Low Maintenance
- Easy Accessibility
- Burns Oil and/or Gas
- Saves Fuel

Saves Space

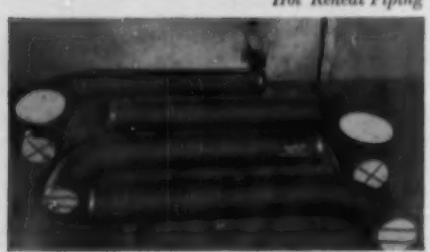
BABCOCK & WILCOX

BOILER DIVISION

Manual metallic-arc field welding. Electric coils, wound around areas adjacent to weld, are used in preheating, and in local stress relieving after completion of weld.

Main Steam Piping

Hot Reheat Piping



Cross-Over Piping

Shop fabricated assemblies above are produced to sizes which installation and shipping facilities permit.

FIELD ERECTION by P.P.&E.

Assures Safe, Efficient Operation of HIGH TEMPERATURE, HIGH PRESSURE PIPING

Pittsburgh Piping and Equipment Company was among the first to recognize the importance of complete piping fabricating service, including the responsibility for erection of the piping system.

At P.P.&E. sub-assembles are shop fabricated in sections as large as shipping facilities and installation area permits, are checked for dimensional alignment, and delivered ready for accurate erection. Field welds are planned for maximum accessibility. Consequently, erection by skilled, specially trained craftsmen is facilitated.

An experienced P.P.&E. field organization handles all erection problems, and coordinates field work with shop fabrication so that materials arrive on schedule, and in the sequence which permits erection to proceed rapidly and efficiently.

PRODUCTS AND SERVICES

Carbon Steel Piping	Forged Piping Materials
Cast Iron Fittings	Headers
Cast Steel Fittings	Manifolds
Chrome-Moly Piping	Pipe Bends
Copper Piping	Stainless Steel Piping
Corrugated Piping	Van Stoning
Creased Bends	Welded Assemblies
Expansion Bends	Welded Stainless Steel Tubing
Flanges	Welding Fittings

Pittsburgh Piping
AND EQUIPMENT COMPANY
158 49th Street — Pittsburgh, Penna.
CANADA: CANADIAN PITTSBURGH PIPING, LTD.
835 BEACH ROAD—HAMILTON ONTARIO

OFFICES IN PRINCIPAL CITIES

Atlanta	Whitehall Building
Boston	10 High Street
Chicago	Peoples Gas Building
Cleveland	Public Square Building
Houston	Heights State Bank Building
Los Angeles	1820 North Alexandria Ave.
New Orleans	P. O. Box 74
New York	Woolworth Building
Syracuse	113 So. Salina Street
Toronto	60 Yonge Street
Washington	Wire Building

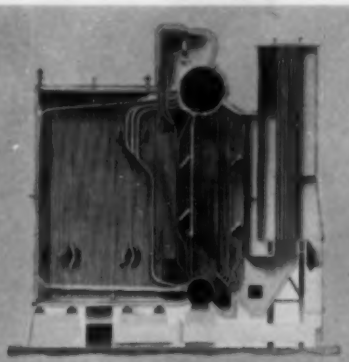
PP-15

one of these C-E standard boilers is . . . .

DESIGNED FOR YOUR PLANT

If your steam needs range between 4,000 and 120,000 pounds per hour, one of these versatile C-E Boilers will give you economical, standout performance. For while they are standard in design (which means lower first cost and proven performance), they're still *flexible* enough to be easily adapted to meet almost any standard requirement.

Chances are that one of the C-E standard boilers is the answer to your steam needs. But whatever they may be, C-E can fill them. For C-E Boilers are made in sizes and types for *any* capacity—for *any* pressure—*any* fuel or method of firing.

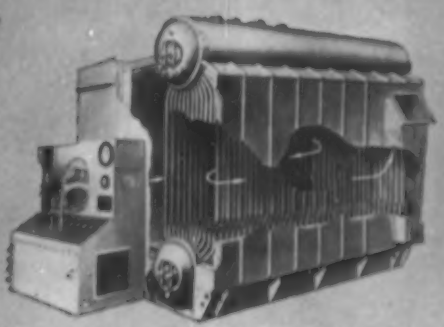


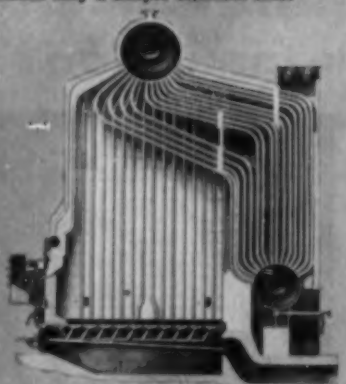
C-E Vertical Unit Boiler, Type VU-55

The VU-55 Boiler is available in six sizes ranging from 50,000 to 120,000 lb of steam per hr. It is designed for two pressure ranges—up to 250 psig and to 500 psig. These units are arranged for the application of superheater surface and heat recovery equipment if desired. VU-55 Boilers are designed for the pressure firing of oil or gaseous fuel and require no induced draft fan. They are equipped with tangential burners and tangent tube furnace walls to assure a level of performance which compares favorably with modern utility practice. The VU-55 Boiler is bottom supported requiring no supporting steel structure. The absence of exterior ductwork permits a smooth, streamlined exterior which is both attractive and practical.

C-E Package Boiler, Type VP

This completely shop-assembled boiler is available in fourteen sizes from 4,000 to 40,000 pounds of steam per hour . . . for operating pressures up to 500 psi . . . for pressure firing of liquid or gaseous fuels. The VP Boiler has more water-cooled area per cubic foot of furnace volume than any other boiler of its size and type. The large lower drum—30-inch diameter—permits a simple, symmetrical tube arrangement . . . greater water storage capacity . . . easy access for washing down or inspection. A centrifugal fan, which operates at low speed and is exceptionally quiet in operation, is standard equipment. The simple baffle arrangement results in low draft loss . . . simple soot blowing . . . no dead pockets . . . high heat absorption. The VP is enclosed in a reinforced gas-tight, welded steel casing, and shipped completely assembled with firing equipment, fittings and forced draft fan. For foundation, it needs only a simple concrete slab.





C-E Vertical Unit Boiler, Type VU-10

The VU-10 is available in nine sizes from 10,000 to 60,000 pounds of steam per hour . . . for operating pressures up to 475 psi . . . superheat to 200° F in 20,000-60,000 lb range . . . for solid, liquid, or gaseous fuels. This boiler is a completely standardized design adaptable to many conditions. It is bottom-supported and needs no outside supporting steel. It operates efficiently over a wide range of output, and is easy to operate and to maintain. All parts are easily accessible for inspection. The VU-10 is a complete unit—boiler, furnace, setting, fuel-burning equipment, controls, forced draft, heat recovery equipment (if desired). Regardless of fuel, the same general cross-sectional arrangement of drums, convection bank and furnace wall cooling is used. Uniform design through each transverse section assures even water level in the drum and uniform expansion.

A C-E Industrial Boiler for Every Need—Combustion Boilers are available in many other 2-drum designs—for capacities up to 350,000 pounds of steam per hour—and to burn any commercially available fuel. All of these boilers can be designed for use with pressures up to 1375 psi and steam temperatures as high as 960 F—utilize any type of heat recovery equipment—fit difficult space conditions. Let us give you full details on the complete line of C-E Industrial Boilers, including the C-E LaMont Controlled Circulation Hot Water Boilers.

8-852A

COMBUSTION ENGINEERING

Combustion Engineering Building, 200 Madison Avenue, New York 16, N. Y.

CANADA: COMBUSTION ENGINEERING-SUPERHEATER LTD.

STEAM GENERATING UNITS; NUCLEAR REACTORS; PULVERIZERS, AIR SEPARATORS & FLASH DRYING SYSTEMS; PRESSURE VESSELS; AUTOMATIC WATER HEATERS; SOIL PIPE

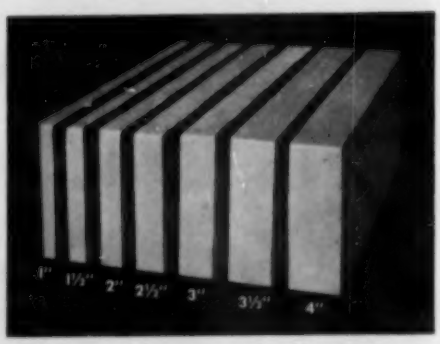
Specify J-M Superex, industry's favorite block insulation

Made from diatomaceous silica and asbestos for all temperatures to 1900F

YOU'LL ENJOY *greater insulation savings* with Superex®. Its unique combination of low conductivity and outstanding resistance to high temperatures provides greater operating efficiency and longer maintenance-free service. That's why Superex is the leading block insulation for furnace work.

Light and easy to work. Superex withstands temperatures to 1900F indefinitely with negligible loss of efficiency and is so strong that it compresses only ⅛ inch under 6 tons' pressure per square foot. Its light weight, excellent working properties and availability in large blocks mean quick, easy, low-cost installation.

For high temperature equipment. Since its introduction in 1927, Superex has received enthusiastic acceptance. Today it economically insulates 90% of the country's hot blast stoves. Other high temperature equipment where Superex has proved its superior performance include most types of industrial and metallurgical furnaces and ovens, stationary and marine boilers, regenerators, kilns, roasters, high-temperature mains, flues and stacks.



Saves waste—Superex comes in 7 standard thicknesses from 1" to 4". Other sizes available on order.

For further information on Superex, write to Johns-Manville, Box 60, New York 16, N. Y. In Canada, Port Credit, Ont.

Johns-Manville *first-in* **INSULATION**

MATERIALS · ENGINEERING · APPLICATION

"DESIGN OF PIPING SYSTEMS"

(Second Edition)

CONTENTS

- Strength and Failure of Materials
- Design Assumptions, Stress Evaluation, and Design Limits
- Local Components
- Simplified Methods of Flexibility Analysis
- Flexibility Analysis by the General Analytical Method
- Flexibility Analysis by Model Test
- Approaches for Reducing Expansion Effects: Expansion Joints
- Supporting, Restraining, and Bracing the Piping System
- Vibration: Prevention and Control
- History and Derivation of Piping Flexibility Analysis
- Derivation of Acoustic Vibration Formulas
- Charts and Tables

M. W. KELLOGG'S DESIGN EXPERIENCE KEEPS PACE

As temperatures and pressures increase in steam-electric power plants, the problems involved in designing, engineering, and fabricating main and reheat steam piping multiply themselves many times over. This emphasizes, more than ever, the value of the long experience, in the laboratory and on the job, of The M. W. Kellogg Company—leader in the power piping field.

More evidence of M. W. Kellogg's accumulated piping design experience and ability to tackle each new power piping project in its stride, is the company's new 400-page book, "Design of Piping Systems"—to be published shortly by John Wiley & Sons. The most comprehensive work ever made available publicly on the physical design of piping, it is one of the many ways M. W. Kellogg cooperates with consulting engineers, engineers of power generating companies, and manufacturers of boilers, turbines, and allied equipment. An outline of contents is shown above.

FABRICATED PRODUCTS DIVISION

THE M. W. KELLOGG COMPANY, 225 BROADWAY, NEW YORK 7, N. Y.

The Canadian Kellogg Company, Ltd., Toronto • Kellogg International Corporation, London

SUBSIDIARIES OF PULLMAN INCORPORATED

You can be sure of getting your copy of this limited edition of "Design of Piping Systems" by writing now to M. W. Kellogg, asking to be notified as soon as the book is available. Ask also for the new, free, 12-page booklet, "Piping Flexibility Analysis," which shows how M. W. Kellogg's various flexibility analyses techniques can cut piping design and construction costs.

POWER PIPING—THE VITAL LINK

TO KEEP COSTS DOWN

KEEP PRODUCTION UP WITH

MANZEL

FORCE FEED LUBRICATION

Pressure Application — Exact Amounts — Accurately Timed

Manzel Force Feed Lubricators insure efficient machinery operation by lubricating automatically. No stops for hand oiling — or because of breakdowns caused by faulty lubrication. They

quickly pay for themselves through savings in down time, labor and lubricants.

These sturdy, dependable lubricators can be installed on new or existing equipment. Write for details.

Professionally qualified engineering representatives throughout the country.

Manzel

DIVISION OF

HOUDAILLE-HERSHEY CORP.

318 BABCOCK ST., BUFFALO 10, N. Y.

$ $ $

For Your Ideas

SP&I's "Helping the Man-in-the-Plant" department (see page 80) features, ideas, methods and gadgets — many plant-tested in Southern and Southwestern industrial, power and service plants.

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

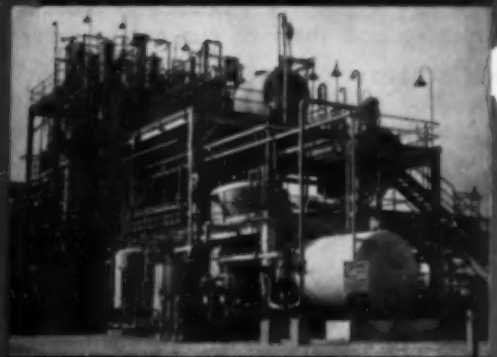
Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

Southern Power & Industry
806 Peachtree St., N.E.
Atlanta 5, Georgia

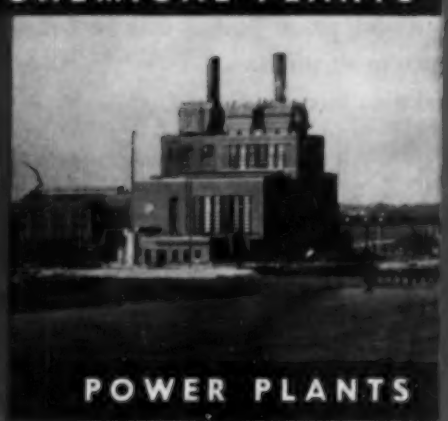
DROP FORGED STEEL

valves, fittings and flanges by Vogt

REFINERIES



CHEMICAL PLANTS



POWER PLANTS

USED and TRUSTED by the NATIONS KEY INDUSTRIES

There are good reasons behind the confidence which America's key industries have placed in Vogt valves, fittings, and flanges for half a century. They know that *drop forged* materials are uniform in structure, fine grained, and free from porosity. They know, too, and appreciate the meticulous care given these products through all stages of forging and machining in Vogt's modern shops, and about the many rigid tests and inspections. And that is why these products enjoy such an impressive record of performance in withstanding the shocks and stresses imposed by high or low pressures and temperatures and in resistance to erosive and corrosive conditions.

Service is another important factor in this confidence because Vogt maintains the world's largest and most complete stock of drop forged steel valves, fittings, and flanges always ready for immediate shipment.

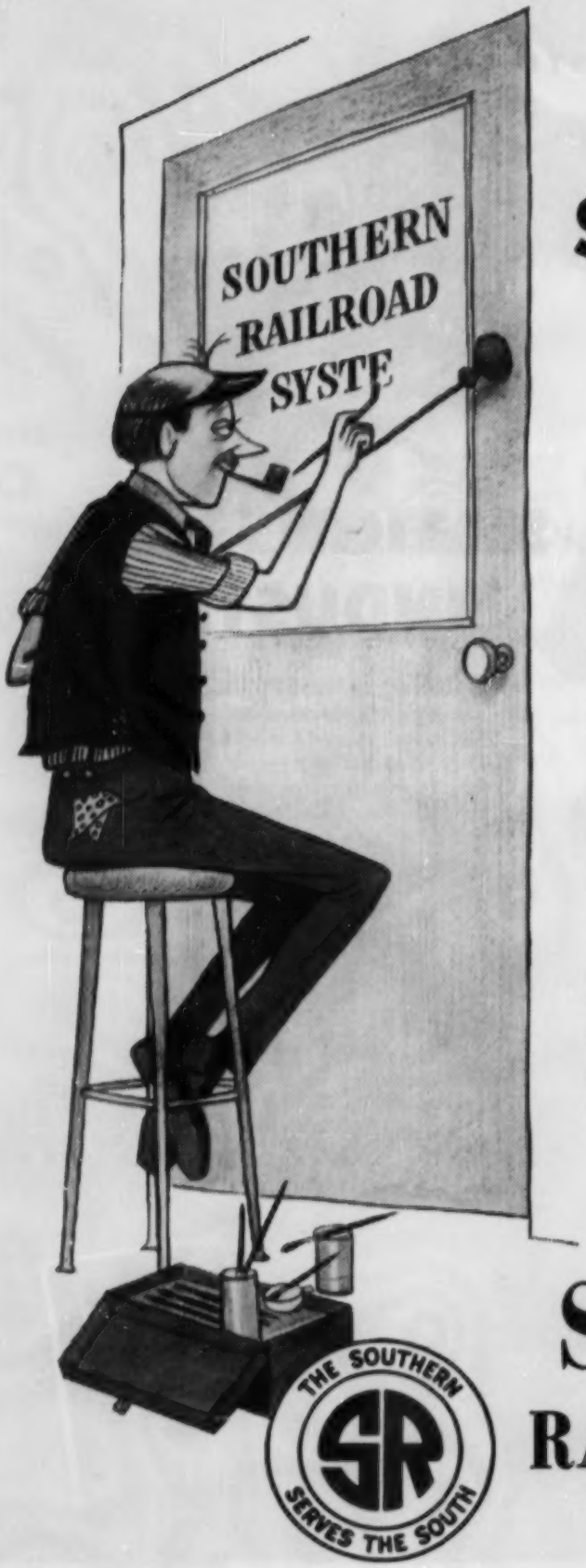
Write for Catalog F-9. Consult its 400 pages for the complete Vogt line of drop forged steel valves, fittings, and flanges for oil, steam, water, air, gas, and refrigeration service.

Address Dept. SPJ5

HENRY VOGT MACHINE CO. 75th Anniversary

HENRY VOGT MACHINE CO., LOUISVILLE, KY.

Sales Offices: New York • Philadelphia • Chicago • Cleveland • St. Louis
Cincinnati • Dallas • Charleston, W. Va. • San Francisco



SOMEBODY GOOFED!

IT'S A COMMON MISTAKE but certainly the sign painter should know better. The word "RAILROAD" should be "RAILWAY," for our correct name is Southern Railway System. Yet it's surprising how many of our good friends and neighbors refer to us as Southern Railroad System.

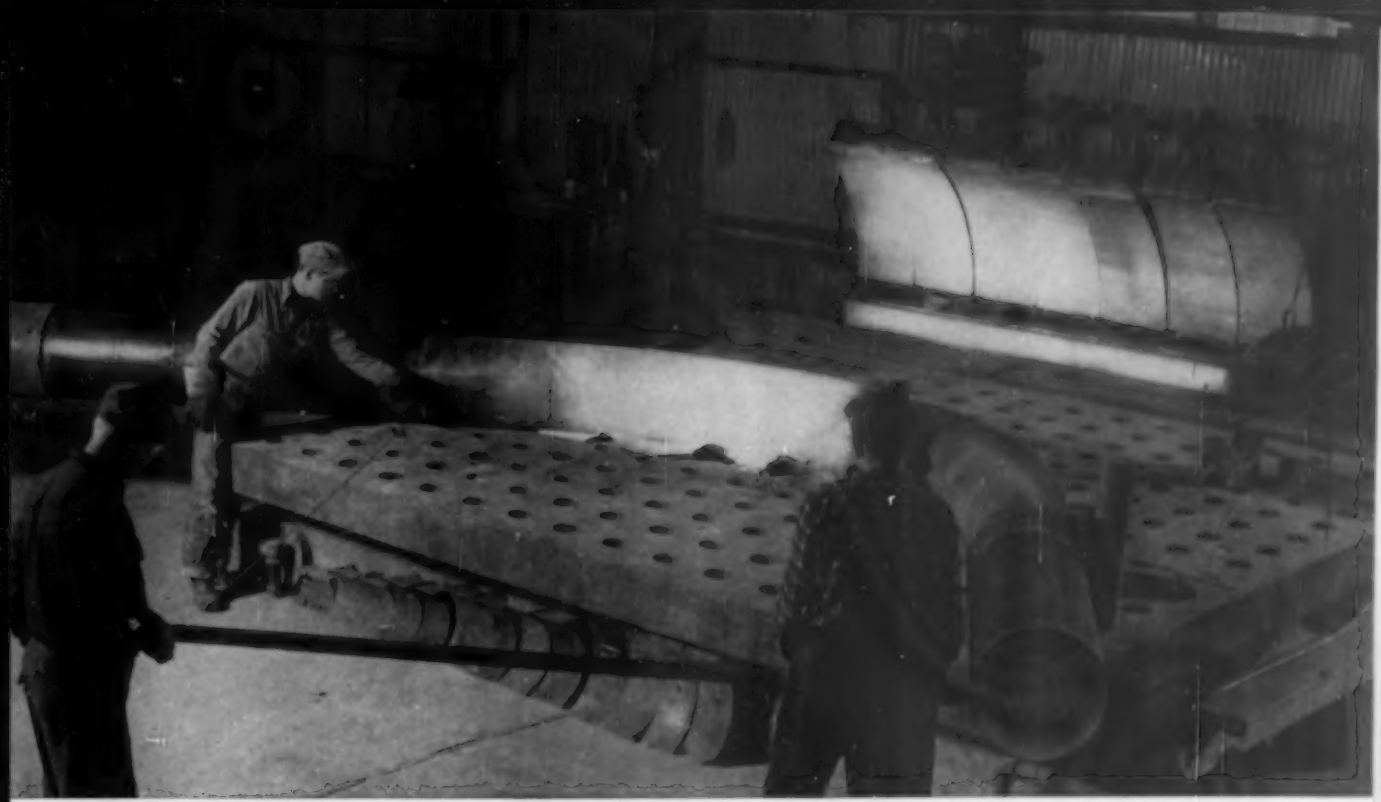
Not that it really matters. *Railroad* or *Railway*, we're still the Southern that "serves the South" —not only as an agency of transportation, but as a job provider, taxpayer and customer, too.

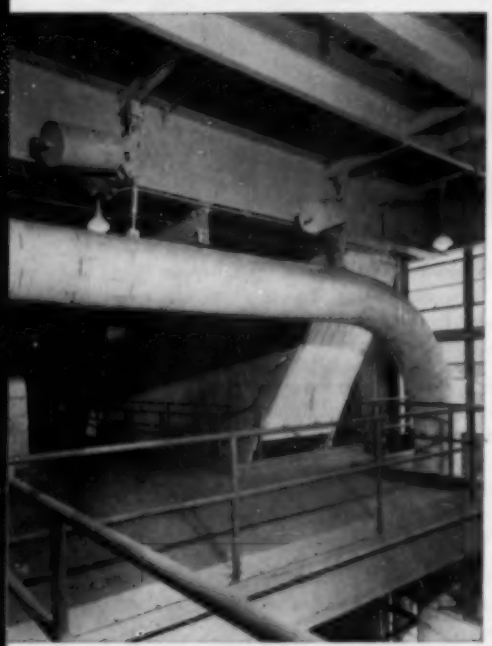
And because what you *say* about us—not what you *call* us—is what counts, we'll go right on doing everything we can to make you pleased with and proud of the railway that means so much to all who live and work in the Southland. Make no mistake about that!

Harry A. DeButts
President

SOUTHERN RAILWAY SYSTEM

WASHINGTON, D. C.





This station, having an initial capability of 276,000 kw, was designed and erection supervised by Gilbert Associates, Inc., Reading, Pennsylvania. It is one of the most efficient and low-cost stations in the country.

At the new Shawville Station of Pennsylvania Electric Co.

it's NAVCO Piping throughout

Over 37 miles of pipe were installed by Navco in this highly efficient reheat station and all necessary prefabricated assemblies, in excess of 2,000,000 lbs., were produced in Navco shops. For field welding only, more than 15 tons of electrodes were used.

The photo above shows one of the bends required for the Main Steam. It is 16″ O.D. forged and bored with a wall thickness of 3.084″ and weighs 5½ tons. Material is ASTM A-335 P-22—2¼% Chrome. Operating conditions are 1850 psi at 1050°F. initial, with 1000°F. reheat.

The photo at the left shows this bend in service supported by dependable Navco Counterpoise Hangers.

In the past three years alone, Navco Piping has been installed in Central Stations generating in excess of 4,000,000 kw.

Next time you have a Piping job requiring reliability in performance and careful attention to every small detail, Navco will welcome the opportunity of quoting you.

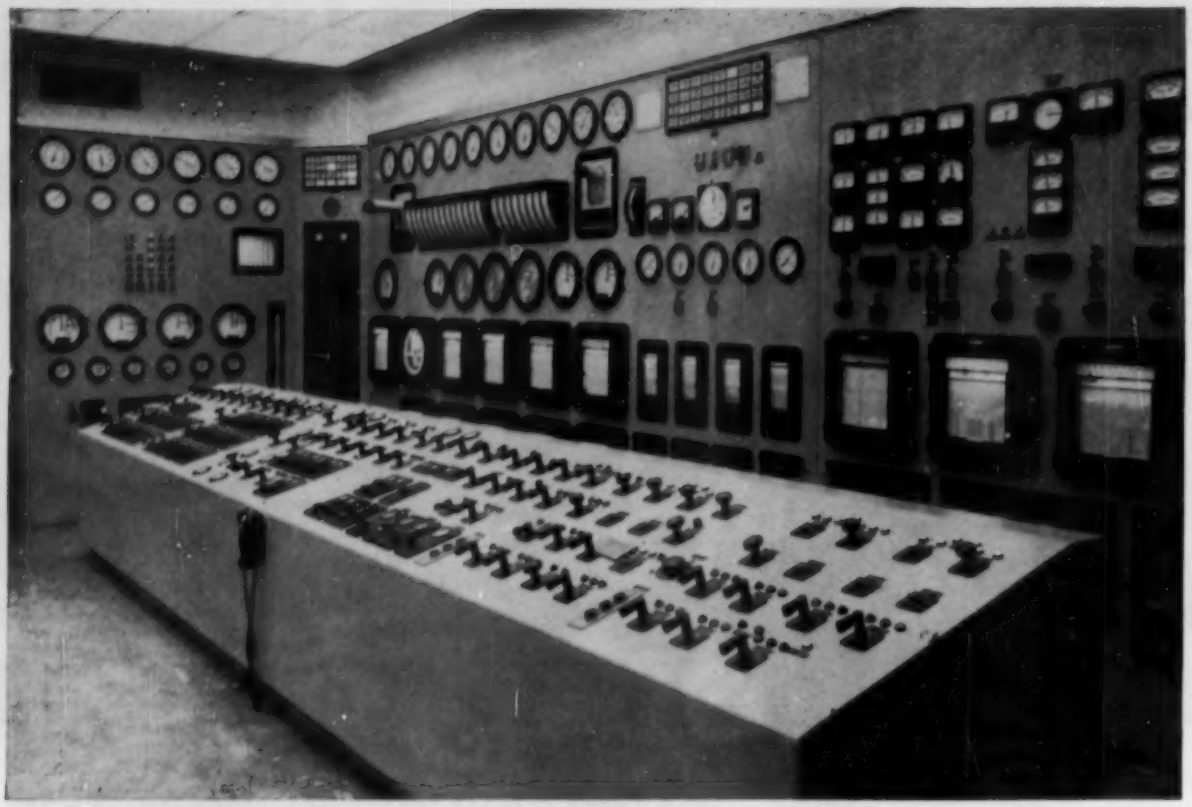
Call, wire or write today!

NAVCO

NATIONAL VALVE & MANUFACTURING COMPANY

3106 LIBERTY AVENUE, PITTSBURGH 1, PENNSYLVANIA

New York • Chicago • Cleveland • Boston • Atlanta • Buffalo • Cincinnati



Centralized controls for station service switching, two 125,000 kw turbines, generators and boilers are in this room. Republic sub-panels on the bench board provide for either automatic or manual control of the boilers.

Operating Boilers Electronically at Alabama Power Company's NEW BARRY PLANT

At the new Barry Steam Plant near Mobile, Alabama, two 900,000 lbs. per hour pulverized coal fired boilers operating at 1875 psi and 1000°F. are controlled by a Republic Electronic Master Combustion Control System.

Electronic impulses control pneumatically operated fuel, draft, and feedwater regulators on the boilers. Master control signals are transmitted practically instantaneously, permitting fast control response and close boiler control.

To ensure that both final firing rate and air flow will rapidly and accurately follow changes in steam load, the control system normally follows a dual element master control. This master controls the boiler auxiliaries from a rapid and proportional steam flow function together with a stabilized steam pressure function. Such a system combines the features of derivative control with automatic correction for fuel variation in such a manner that the effects of load swings are minimized almost to the vanishing point. Other control problems such as feedwater control and steam temperature control are simplified by the coordination of boiler auxiliary functions due to this system of combustion control.

Boiler feedwater is controlled automatically by a Republic three-element feedwater control. To prevent heat damage to feedwater pumps during low flows, a Republic pump by-pass system has been installed. It automatically maintains a minimum flow of 125 gpm through each pump (two pumps per boiler) returning by-passed water to the deaerating heater storage tank.

Final efficiency tests recently completed at the Barry plant indicate the expected plant heat rate has been fully realized. There are Republic Automatic Combustion Control Systems — electronic or pneumatic — for all sizes and types of boilers, all methods of fuel firing and for any arrangement of draft equipment. For full details, write today.

REPUBLIC FLOW METERS CO.

2240 Diversey Parkway, Chicago 47, Illinois

Georgia Power Company looks ahead—

selects GULFCREST OIL for long range protection

Georgia Power Company's Yates Plant at Newnan, Georgia, has three 100,000 KW General Electric Turbines in operation and is adding a fourth, which will be a 125,000 KW unit. 3,450 gallons of Gulfcrest Oil in each of the lubrication systems provide safe, sure, long-lasting protection.

Gulfcrest Oil has been in service at the Yates Plant of Georgia Power since 1950. Turbine systems are clean, there is no rust, sludge, or foam. But this is only the beginning. Gulfcrest will provide safe, sure protection for many years to come. (Gulfcrest has been in continuous service in several large turbines for over 20 years.)

There are good reasons for Gulfcrest's recognition as the world's finest turbine oil. Carefully selected crude oils are thoroughly refined, then super-refined by Gulf's exclusive Alchlor Process. This removes the unstable hydrocarbons that accelerate oxidation, form sludge and harmful acids. Then the right additives are properly combined, and you have a turbine oil that delivers superior performance in every type of steam turbo-generator.

A trained, experienced lubrication expert—the Gulf Sales Engineer—is as near as your telephone. Have him recommend the right grade of Gulfcrest for your turbines. Consult the telephone directory for the number of your local Gulf office.

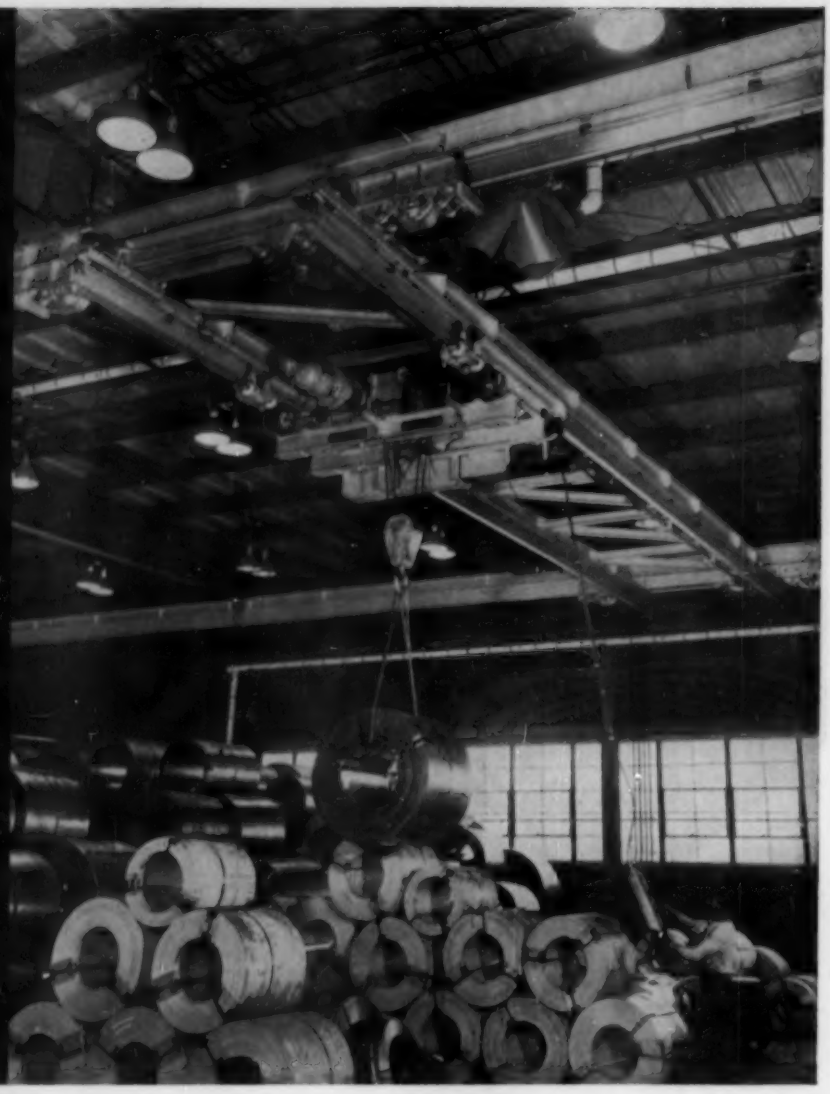
GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

GULF OIL CORPORATION • GULF REFINING COMPANY
1822 GULF BUILDING, PITTSBURGH 30, PA.

NEW MONORAIL CRANE

offers many advantages



For up and over handling this new American MonoRail Crane offers you the following advantages:

- up to 10 ton capacity
- meets low headroom conditions
- extra store room
- carrier service beyond craneway
- fingertip control from floor
- all movement power operated
- low maintenance cost

These are but a few reasons why you should call an experienced MonoRail engineer to help you with your handling problems.

AMERICAN OVERHEAD HANDLING EQUIPMENT

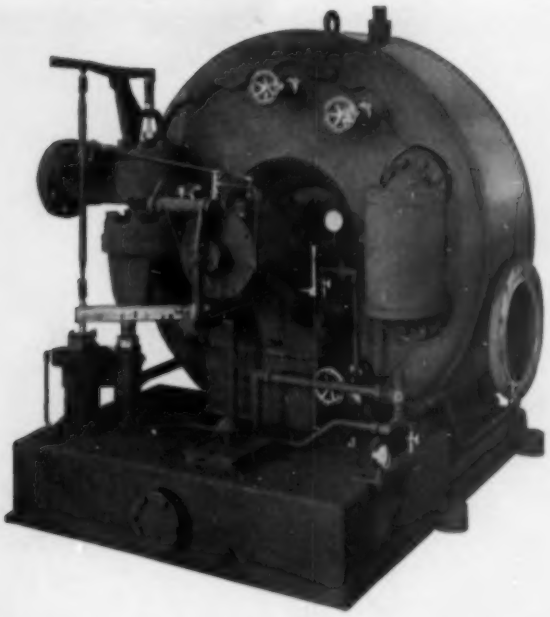
MONORAIL COMPANY

13105 ATHENS AVENUE • CLEVELAND 7, OHIO

"Up-and-Over" is the title of our 16-mm sound film showing how MonoRail solves many tough handling problems at low cost. Please allow us three weeks to schedule a showing for you.

Member
Materials Handling Institute • MonoRail Association

TROUBLE-FREE TURBINE OPERATION STARTS HERE



Terry solid wheel turbines have become a symbol for dependable, trouble-free operation. The reason—simplicity and ruggedness of construction.

Take the rotor, for instance. It's a solid forging in which a series of semi-circular buckets is milled. There are no separate parts to loosen or work out. Since the only function of the blades is to form a series of pockets, any wear which might occur would not materially affect horsepower or efficiency.

It is impossible for the blades to foul. They have large clearances and are further protected by the projecting rims at the sides of the wheel. As the side clearances are also very large, end play can do no harm.

Simplicity outside too—as you can see from the photograph of the 1500 HP at 3500 RPM solid wheel turbine above. This turbine is equipped with an oil relay governor and forced feed lubrication to the bearings.

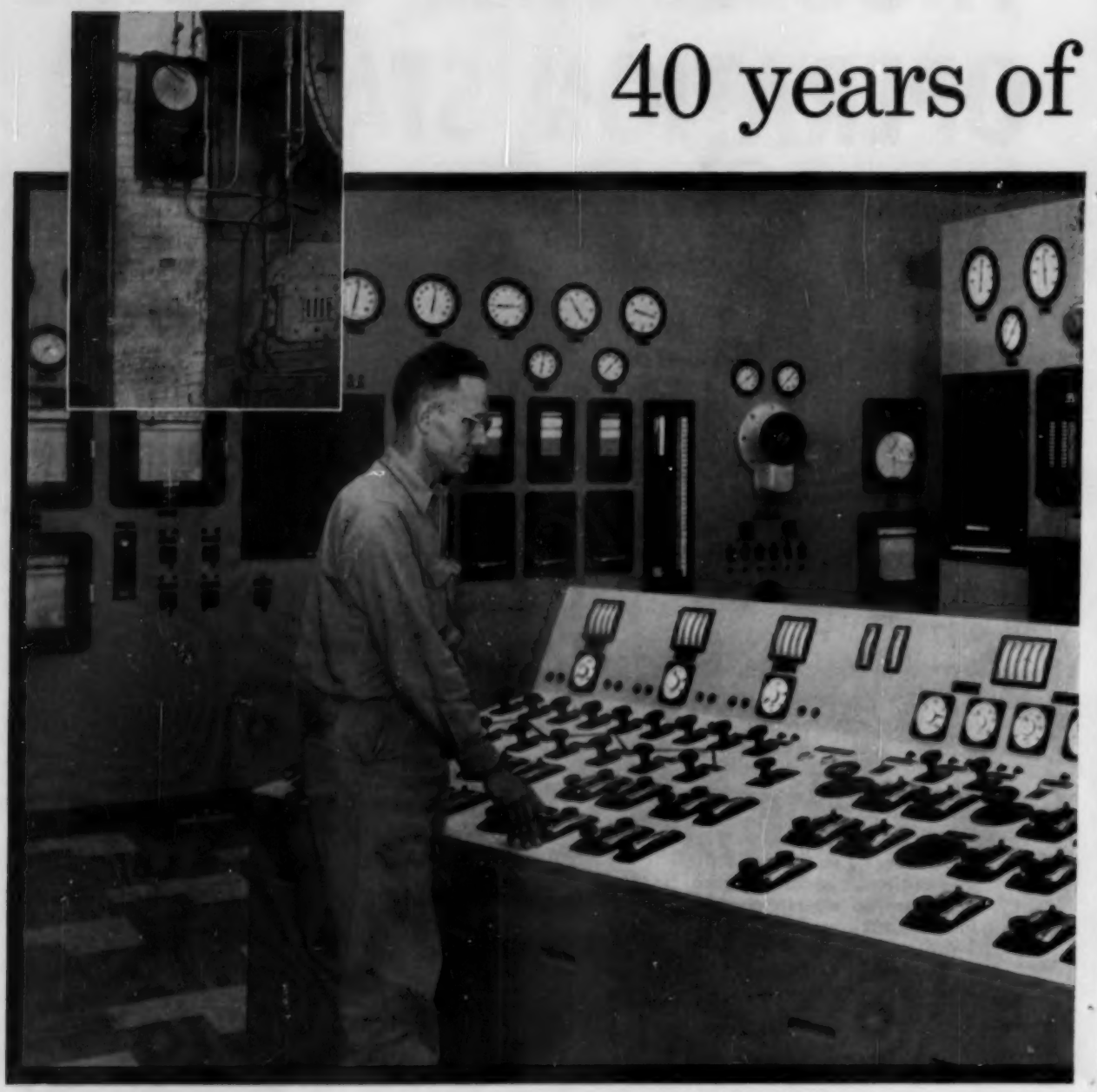
For more about these *work horses of industry*, send for a copy of bulletin S-116. No cost or obligation.

THE TERRY STEAM TURBINE CO.
TERRY SQUARE, HARTFORD 1, CONN.

TERRY

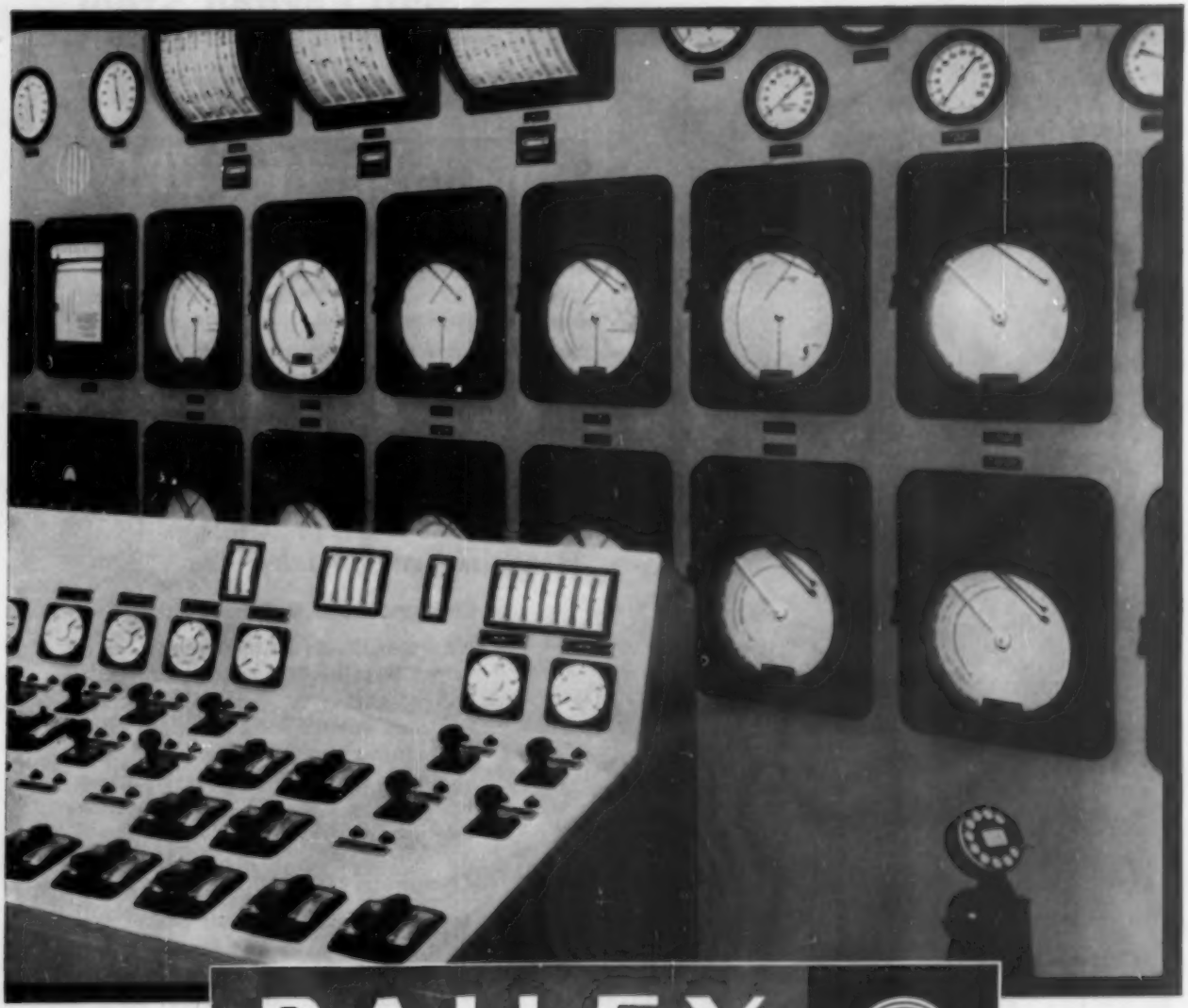
TT-1200

40 years of



As ASME celebrates its 75th, Bailey Meter Co. completes its 40th year . . . The contrast between the Bailey installation of 1916 and the control room of today shows 40 years' progress in boiler control. In this progress, the completeness of the Bailey line has played its part, as has the breadth of Bailey Engineering Service . . . but most important has been a steadfast service policy of *making it work. That policy is expressed today in the most widespread network of Sales-Service Engineers provided by any manufacturer of boiler control systems,* sustaining the reputation of *the company built on service.*

"MAKING IT WORK"...



BAILEY
METER COMPANY
1028 IVANHOE ROAD
CLEVELAND 10, OHIO
Complete Controls for Steam Plants

BAILEY METERS
Controls for
COMBUSTION
FEED WATER
TEMPERATURE
PRESSURE
LIQUID LEVEL
FEED PUMPS

A127-2

One Answer

...for EVERY Small Forged Steel Gate Valve Application

Chapman List 960

If you want a small gate valve to control pressures from 380 pounds at 1000°F to 2000 pounds at 100°F . . . if you want low cost operation under the most grueling of conditions . . . if you want top valve performance . . . specify Chapman List 960. It's the forged steel gate valve that's the popular choice for a wider variety of applications than any other comparable valve on the market today.

Here's the reason why:

Chapman List 960 is tough

It has wedge faces hardened to 800 Brinell by the exclusive Malcomizing process to prevent seizing or galling. Replaceable hardened stainless steel seat rings assure tight closing and smooth operation. Snug seating permits full pressure repacking. Extra strong stem and gate connections take unusual stresses.

Chapman List 960 is versatile

It's available in all standard sizes from ¼" to 2" with screw or welding ends, and in two types, rising stem with yolk and rising stem with inside screw. Made in various alloys and combinations of alloys, the Chapman List 960 guarantees reliable performance over an unusually wide range of applications.

Whatever your needs for small forged steel gate valves the Chapman List 960 can do the job better and at lower operating cost. For higher pressures specify Chapman List 990. Write today for Catalog 10 and get full details.

The CHAPMAN Valve Manufacturing Company
INDIAN ORCHARD, MASSACHUSETTS

TIMELY COMMENTS

SOUTHERN POWER AND INDUSTRY

New Raw Materials—New Products for Industry

Nitroparaffins From Louisiana

NEW plastic-like materials, corrosion inhibitors, hard waxes and aircraft fuels for use at altitudes where little or no oxygen exists, are among the end products recently reported being developed from the **nitroparaffins**, an entirely new family of chemicals. **Commercial Solvents Corporation** recently attained full scale production at the company's first nitroparaffins plant at **Sterlington, Louisiana.**

Basic manufacturing impact—Greatest stress was laid upon the impact of the nitroparaffins in the early stages of manufacturing processes which turn out consumer goods. One field of great potential application is the use of nitrohydroxy compounds, a group of nitroparaffin derivatives, employed as hardening agents for protein substances. Here the NP's function as odorless sources of formaldehyde, a chemical used in scores of industrial processes.

Plastic-like materials—Use of Tris-Amino (one of the 10 NP's now flowing through the Sterlington, La., plant) was reported by an Armour & Co. chemist. A series of compounds with unique properties has been obtained when Tris-Amino was used in conjunction with fatty acids, and when the resulting formulation was reacted with formaldehyde. Products obtained included materials with potentially useful plastic-like qualities, enduring waxes, and a number of plasticizers. All of these products show excellent resistance to corrosion due to alkali substances. This resistance opens their use in a number of production and chemical handling problems.

Shinier and longer lasting **floor waxes** which do not require rubbing or polishing are resulting from the use of another derivative. Importance of nitroparaffins to the **coatings industries** was also stressed. They are very effective in the production of coatings based on vinyl resin co-polymers and cellulose acetate.

Nitromethane, a basic nitroparaffin, is being investigated as a **fuel of the future.** Nitromethane (now being used as a special fuel in racing and model engines) supplies its own oxidizing agent. It can produce energy without the need of outside sources of oxygen, such as air. Another compound is being widely used in the process of bringing bright, fast colors to the new hard-to-dye **synthetic fibers.** Equally important is the pilot plant work being done on the use of nitromethane as a solvent for making synthetic fibers.

Low-Temperature Tar From Texas

THE chemical industry has a new raw material from which a long list of new and known products may evolve. This new material is a low-temperature tar derived from the carbonization of lignite at the **Aluminum Company of America's** plant near **Rockdale, Texas.**

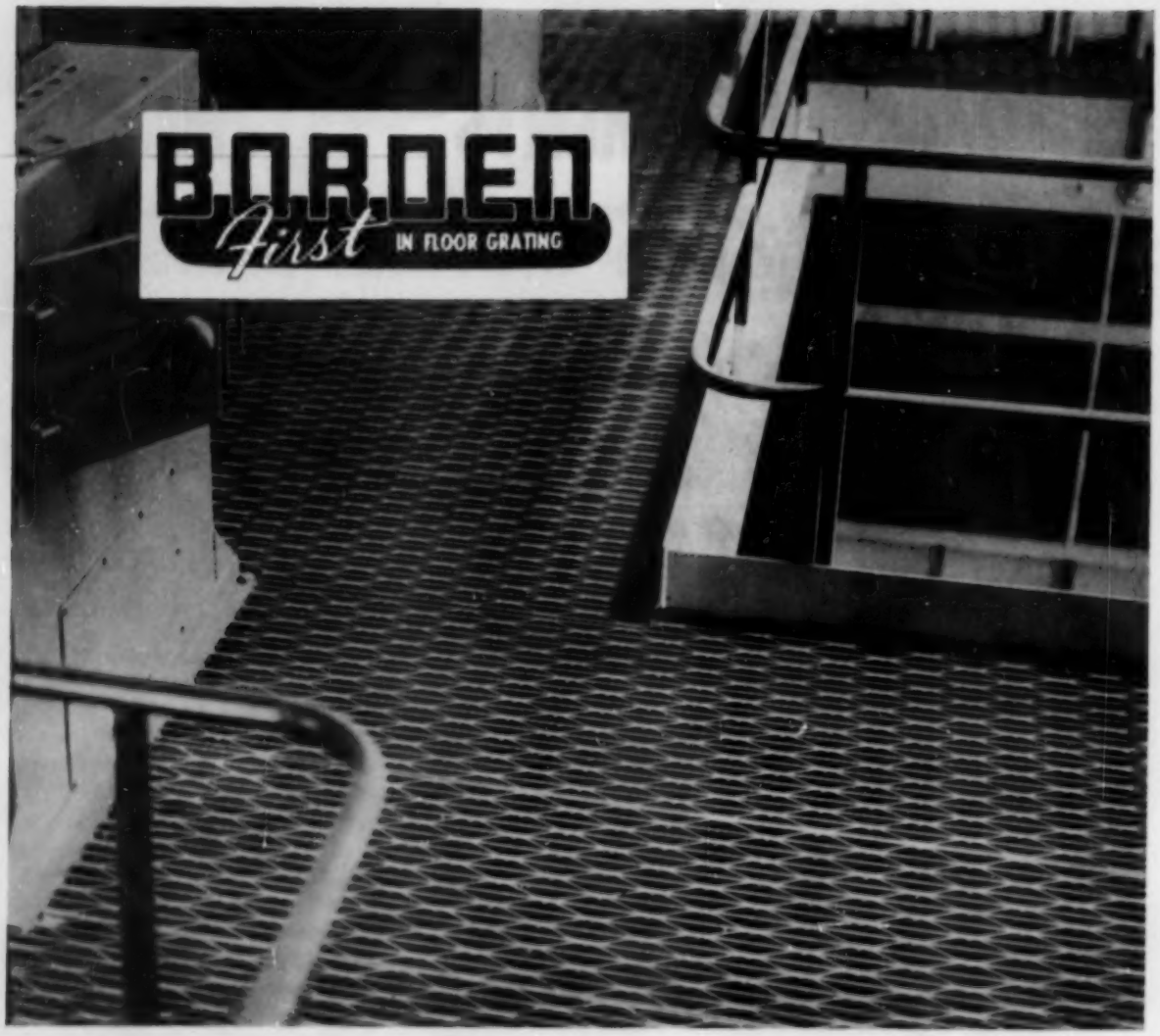
It is known that low-temperature lignite tar contains valuable chemical compounds, but their utilization for chemical purposes has to date not been economically practical because no commercial quantities have been available.

Research and utilization of lignite tar became possible when Alcoa placed in operation its new aluminum smelter in Rockdale. Here dried lignite and carbonized lignite are used for the first time in this country as a fuel for generation of power for the smelting of aluminum.

A prototype carbonizer and tar recovery unit has been built and will produce 16,000 gallons of lignite tar a day when in continuous operation. A research and utilization program, based on this new and relatively unknown material, is co-sponsored by Alcoa and Texas Power & Light Company. Research on the tar is being conducted by Battelle Memorial Institute in Columbus, Ohio.

As results from this research are available, findings will be furnished to the companies now participating in the research and utilization program.

Lignite tar products not purchased by these participating companies will be made available to other firms. Samples of materials presently available and specifications on such materials may be obtained from Texas Power & Light Company, P. O. Box 6331, Dallas 22, Texas, marketing agent for Alcoa for this material.



BORDEN MANUFACTURES EVERY TYPE FLOOR GRATING

IN FERROUS AND NON-FERROUS METALS

- **EASY TO INSTALL** — engineered in conveniently sized units for easy installation.
- **EXTRA STRONG** — reinforced, designed with maximum safety factor.
- **LIGHT WEIGHT** — approximately 80% open, reduces dead weight, allows greater live load.
- **SELF-CLEANING** — creates greater safety, economy of maintenance, no sweeping or washing required.

Write for complete information on BORDEN All/Weld, Pressure Locked, and Riveted Floor Gratings in this FREE 8-page catalog

BORDEN METAL PRODUCTS CO.

853 GREEN LANE Elizabeth 2-6410 ELIZABETH, N. J.

SOUTHERN PLANT—LEEDS, ALA. — MAIN PLANT—UNION, N. J.

BORDEN METAL PRODUCTS CO.

Gentlemen:

Please send me BORDEN Catalog

NAME .....

TITLE .....

COMPANY NAME .....

ST. AND NO. .....

CITY AND STATE .....

INDUSTRY SPEAKS

MAINTENANCE CONTROL in Power Plants

MAINTENANCE cost in power plants is a relatively unexplored field which offers the greatest opportunity for savings in total production costs.

This observation was made in Chicago recently in one of the three papers covering the latest facts and principles of maintenance control at power plants. The papers were presented at the November diamond jubilee annual meeting of The American Society of Mechanical Engineers.

Authors of the paper quoted were **W. F. Oberhuber** and **C. W. Watson,** superintendents of the Philadelphia Electric Company; **V. F. Estcourt,** general superintendent of the Pacific Gas and Electric Company, San Francisco; and **G. V. Williamson,** of the Union Electric Company of Missouri.

Mr. Oberhuber and Mr. Watson covered the main factors affecting maintenance costs—original design, management policy, planning, organization, and cost accounting.

Their company plans putting **major turbine inspections** on a regular five-year basis, they said. When **dismantling equipment** they have found it less costly in the long run to keep enough men on hand to cope with every eventuality and to pay standby time than to call in additional men, or men of different skills, after finding out what is wrong.

Philadelphia Electric has also lowered its production costs by organizing its **maintenance staff** of about 450 men for all plants into **one strongly centralized group,** operating under one head. The unit includes a special training group giving both classroom and on-the-job instructions.

Mr. Estcourt, presenting the second paper, concentrated on two main points—the cost of replacement power while a generating unit is out of service, and the need for better skilled engineering graduates to cope with the increasing technical and physical complications in power plants.

"It is not uncommon for the average net cost of **replacement power** to run between $2000 and $5000 per day," he said, "with some instances as high as $9000 per day. The total cost during a major overhaul of a unit may range between $80,000 and $200,000."

Mr. Oberhuber and Mr. Watson, who also covered the cost of replacement power, said that over a six-year period this cost at Philadelphia Electric had averaged $1.3 million a year, or about 20 per cent of the steam station maintenance cost.

The third paper, presented by G. V. Williamson, covered economical maintenance programs in large central steam stations. The author based his presentation on his company's ten-year program of detailed cost records for hundreds of individual items of equipment and on other accounting and engineering studies.

He also described a method of **test maintenance** carried on by his company. This involves the installation on turbo-generators at time of purchase of equipment for highly accurate readings on stage pressures, temperatures, bearing vibration, bearing elevation, spindle position, capability and efficiency.

"On modern, high speed, high pressure, close clearance equipment these readings reflect internal conditions almost as well as lifting the casing," he said.

On all units installed since 1942 his company has adopted test maintenance instead of preventive maintenance at regular three- or four-year intervals.

"It is felt that more harm than good can be done by an unneeded opening up of high pressure casing," Mr. Williamson said. "The elimination of one three-week outage on a large unit can be worth $200,000 in system operating costs, and eminently worth the test effort."

Copies of all three papers can be obtained at 50 cents each from Order Dept., ASME, 29 W. 39th St., New York 18, N. Y. The Oberhuber-Watson paper is No. 55-A-128; Mr. Estcourt's No. 55-A-87; Mr. Williamson's No. 55-A-174.

The Use of Hydrazine To Prevent Oxygen Corrosion

By
E. C. FISS,* Director
Special Development Section
Duke Power Company
Charlotte, N. C.

OUR EXPERIENCE with oxygen corrosion began in 1946 when we had tube failures in a 900 psig 375,000 lb/hr boiler. Some of these failures occurred at welds but most of the failures occurred at places other than welds and all failures were caused by pitting typical of oxygen corrosion.

A sodium sulfite treatment was initiated and proved to be an adequate control for the oxygen corrosion occurring in this boiler. Similar failures occurred in two identical boilers of the same capacity and sodium sulfite also proved to be adequate as a means of controlling the oxygen corrosion in these boilers.

Six other boilers have also been treated with sodium sulfite. In two of these boilers oxygen corrosion was the principal difficulty, but in the case of the other four boilers, the sodium sulfite treatment was deemed desirable even though oxygen corrosion was responsible only in a minor way for the undesirable condition which prevailed.

Experience with Sulfite

Experience with the use of sodium sulfite as a reducing agent for the treatment of boiler feedwater indicated that it had several undesirable characteristics. We learned that there was a limiting concentration which, when exceeded, resulted in sulfite decomposition to produce sulfide.

The presence of sulfide in the boiler feedwater system results in an acid condition which produces excessive corrosion and scale deposition in various portions of the system. These 900 psig boilers could only be operated without observed sulfite decomposition when the sodium sulfite concentration in the boiler water did not exceed approximately 10 ppm and 5-10 ppm was found to be a practical operating range.

When sodium sulfite is fed so as to produce the desired result, it reacts with the dissolved oxygen to form sodium sulfate which increases the dissolved solids concentration in the boiler water and requires increased blowdown.

In addition, boiler water containing normal concentrations of sodium sulfite exhibits the tendency to seep through small openings which would not normally leak when exposed to water containing no sodium sulfite. This seepage produces salt accumulations which cause corrosion and erosion of packed and gasketed joints. Considerable maintenance on valves and manhole plates was required.

Information on Hydrazine

Considering these generally undesirable characteristics of sodium sulfite, we concluded that it would be desirable to find some other reducing agent more suitable for use in boiler water and boiler feedwater. Of all the known reducing agents whose use appeared to be at all practical, hydrazine seemed to show the most promise.

Information available in the literature indicated that hydrazine will react chemically with dissolved oxygen to form nitrogen and water according to the following equation:

$$N_2H_4 + O_2 = N_2 + 2H_2O$$

In addition, hydrazine is a liquid and the products of its reaction with oxygen are liquids or gases so there is no increase in dissolved solids. This permits operating with minimum blowdown and eliminates or greatly reduces maintenance required on valves and handhole seats as a result of corrosion and erosion at any points where seepage might occur.

Hydrazine hydrolizes when dissolved in water to produce a slightly alkaline solution, which property should be helpful in both boiler water and boiler feedwater conditioning and should also be an advantage if any hydrazine should distill over with the steam.

Available information indicated that hydrazine does decompose at elevated temperatures to form ammonia and nitrogen and possibly hydrogen according to the equations:

$$3N_2H_4 = 4NH_3 + N_2$$
$$2N_2H_4 = 2NH_3 + N_2 + H_2$$

These reactions are typical of many reported as occurring under varying conditions of temperatures and concentration and the presence of various catalysts.

* Presented at the Engineering and Operating Section Conference, Southeastern Electric Exchange, Charlotte, N. C., September 22, 1955.

While such decomposition of hydrazine to produce ammonia is undesirable, a certain amount of ammonia in a steam turbine feedwater cycle can be tolerated. In fact, the deliberate addition of ammonia to correct certain low pH conditions sometimes found in feedwater systems is not uncommon. However, a combination of ammonia and oxygen is quite corrosive to copper, brass and cupro nickel alloys and the concentration of ammonia and oxygen in the system must be controlled.

The ammonia concentration in the condensate is a convenient guide for determining when the hydrazine concentration in the boiler water is excessive. Conductivity can easily be used to indicate the presence of ammonia.

Tests with Hydrazine

A trial treatment was started in 1951 when hydrazine was fed into the boiler feedwater for a 450 psig 380,000 lb/hr boiler. It was found that a hydrazine residual could be established and maintained without any apparent ill-effect. The hydrazine was consumed, apparently reacting with oxygen or oxides, and the amount of ammonia formed by its decomposition could be controlled by limiting the hydrazine concentration in the boiler water.

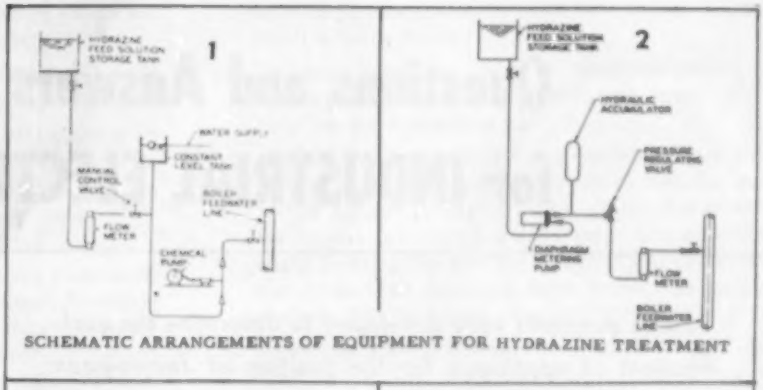
Neither the nitrogen nor water produced as end products of the reaction with oxygen have proved harmful in any way—the water being indistinguishable from the water already in the boiler and the nitrogen being removed from the system at the air ejector equipment or the deaerator, or both, without difficulty.

The hydrazine treatment in this boiler was continued to determine the results of a continuous treatment for extended periods.

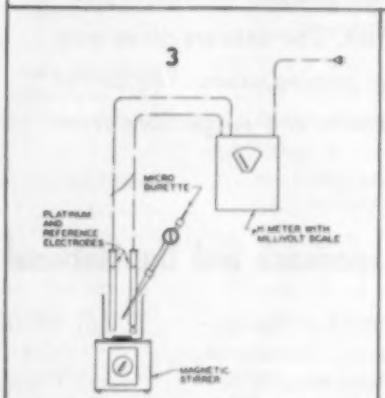
Application of Hydrazine

In 1952 a series of tube failures occurred in a 1350 psig, 620,000 lb/hr boiler which had been in service for four years without any prior chemical water treatment. Failures continued to occur at a steadily increasing rate and examination of tube sections revealed severe pitting at, and adjacent to, the tube welds. It was concluded that dissolved oxygen was primarily responsible for this corrosion even though the observed oxygen concentration in the feedwater did not exceed 6 parts per billion.

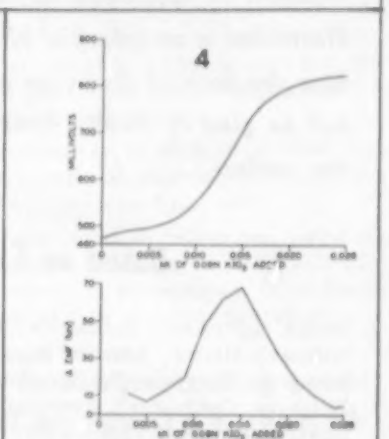
In view of the fact that sodium sulfite decomposition occurred in boilers operating at 900 psig and was assumed more likely to ocur in boilers operating at 1350 psig, the use of sodium sulfite appeared undesirable, especially when the successful experimental use of hydrazine previously described was considered. Consequently, the treatment of the boiler feedwater for this boiler with hydrazine was initiated.



SCHEMATIC ARRANGEMENTS OF EQUIPMENT FOR HYDRAZINE TREATMENT



LABORATORY EQUIPMENT REQUIRED FOR DETERMINING HYDRAZINE RESIDUALS.



TYPICAL TITRATION CURVES

Results with Hydrazine

At the time the treatment was started tube failures of the type shown were occurring about once a week. Since the hydrazine treatment was started, two tube failures have occurred; one after 3 weeks and the other after 15 months, and none have occurred for the past 2 years. The present condition of three tube sections recently removed from this boiler is satisfactory. Corrosion which was obviously occurring in one of these tube sections prior to beginning of hydrazine treatment has been arrested. From the experience described, it seems reasonable to conclude that the use of hydrazine effectively prevents oxygen corrosion.

Sections of tubes were also recently removed from two controlled circulation boilers which operate at 1850 psig and are being treated with hydrazine. These sections were cleaned in inhibited hydrochloric acid so that the actual depth of any pits might be observed. These examinations indicate that no corrosion is occurring at the welds. Other sections, also recently removed from another controlled circulation boiler show no evidence of corrosion.

Present Practice

At the present time we are treating 17 boilers with hydrazine and this is the only chemical treatment being used. The amount of

(*Continued on page 49*)

Questions and Answers for INDUSTRIAL ELECTRICIANS

These questions were developed to determine the qualifications of applicants for the position of Journeyman Electrician in an industrial plant. The answers given may form the basis of discussion in coming issues. The Editor will be glad to receive comments and suggestions from the readers.

By ROBERT U. GARRETT
Chief Electrician
Oerlikon Tool & Arms Corp. of America
Asheville, N. C.

Based on Experience and the National Electric Code

1. Define the terms: Accessible; Branch Circuit; Cabinet; Device; Circuit Breaker; Hazardous Location; Raceway; Service Conductor; Service Entrance Conductor; Over-load Device; Dust-tight; Dust-proof; Vapor-tight; Explosion-proof; Hoist-way; Feeder; Guarded.
2. Explain the difference between "service ground," "equipment ground" and the maintenance term "grounded line" (or circuit).
3. Under what conditions may an un-insulated current carrying conductor be pulled in the same pipe with insulated conductors?
4. (a) In a multiphase wiring system, which conductor would you identify?
   (b) Which one would you ground?
5. In a service conduit run it is necessary to cut in a pull box or use a piece of flex-steel conduit. (a) What special provision, if any, would you make?
   (b) Would you splice the conductors?
6. (a) On voltages above 250 volts to the ground, in a conduit system, what precautions, if any, would you take about locknuts?
   (b) On #4 wire or larger, what about bushings?
7. Assuming that a 3-phase, 4-wire, 480/277 volt system is perfectly balanced out at 50 amps per phase, what current, if any, is the neutral conductor carrying? Why?
8. Draw the following diagrams roughly but plainly:
   (a) Connect 3 transformers from a 3-phase, 3-wire primary to a 3-phase, 3-wire secondary, Delta-Delta. Now, connect the secondary in Wye and grounded neutral. What difference, if any, occurs in the secondary voltage?
   (b) Control a single phase current carrying device (assuming 120 volts) from 4 points.
   (c) Using "Start-Stop" push button stations, control a motor through a magnetic starter from 3 points. Show operating coil only.
   (d) Now, assuming that the starter is of a magnetic-reversing type, start, stop and reverse, show control from 2 points. Show operating coils only.
   (e) Connect a 120 volt voltmeter to a 480 volt line through the proper transformer and name it.
   (f) Connect an ammeter to this same line through the proper transformer and name it.
9. In a 3-phase, 3-wire un-grounded Delta system in conduit, one phase breaks down to the pipe. (a) What, if anything, happens? (b) Assuming this system is Wye connected secondary and midpoint grounded at transformer, and the breakdown occurs, what, if anything, happens?
10. State for what purposes the following are used: (a) Auto-transformer; (b) Ignition transformer; (c) Constant-current transformer; (d) Load balancing transformer; (e) Phase changing transformer. (f) Can you convert from 2-phase to 3-phase through a transformer bank?
11. How many classes and divisions does the Code list for Hazardous Locations? Describe very briefly the atmospheres and operation conditions covered by Article 500.
12. (a) What is meant by a motor "single phasing"; (b) What type of motor "goes hunting" occasionally? (c) How would you remedy such a condition?
13. What instrument, commonly used industrially,

would you probably use to periodically check the condition of motors and wiring systems?

14. Name three (3) of the most common methods of changing the speed of an induction type motor.
15. (a) Describe briefly the difference between an Ammeter and a Wattmeter. (b) Very simply stated, just what is "Power Factor"? (c) What two generally accepted methods are used industrially to correct a low P.F. condition?
16. (a) In a routine inspection of a group of motors, what three (3) things would you check for while motors are in operation? (b) What is commonly known as a "Tong-test" instrument? (c) What is one of the most commonly used testing devices in routine work?
17. Where and under what conditions does the Code require that a switch or other disconnecting means be put in the grounded side of a single phase 2-wire branch circuit?
18. (a) Briefly, what is a poly-phase circuit? (b) How would you go about balancing out? (c) Assuming a single phase, 3-wire, 115/230 volt system is out of balance by a 200 watt lamp on one side and a 25 watt lamp on the other side. The neutral wire is opened. What condition results and what, if anything, happens to the lamps?
19. (a) Describe briefly a synchronous motor. What are its speed characteristics? (b) What, if any, additional equipment is required for its installation and operation other than that required for a squirrel cage motor?
20. To what other use, besides being adaptable to varying or variable speed operation, is the "slip-ring" motor sometimes put?
21. Assume you are called on a power failure and you find the main disconnect open. The far end of the circuit is out of sight of the disconnect. Would you (a) close the disconnect first and then begin locating the trouble or would you (b) check the entire line first and then begin looking for obvious trouble before closing disconnect?
22. When you open a disconnect to work on the line, what is the first thing you would think about or think of doing?
23. When you are issued a ladder or rope fall from the tool crib, what is the first thing you would do, assuming you are even in a hurry?
24. When it is necessary to work in a close space with live parts exposed, what precaution for your own personal safety would you take?
25. Explain in detail what procedure you would take when (a) a person is in contact with a hot line and (b) a person is unconscious from electric shock. Explain step by step your procedure.

Answers to the preseding questions will be found on page 56

Use of Hydrazine

(*Starts page* 46)

hydrazine being fed is 3-5 times the theoretical amount required to react with the dissolved oxygen and the actual feed rates range from 2-4 equivalent per billion. Such feed rates maintain a residual of 5-20 epb in the boiler water and produce an ammonia concentration in the feedwater of .05-.15 ppm. These ammonia concentrations, we believe, are not unusual.

It is believed that the excess hydrazine above the amount theoretically required to react with the dissolved oxygen is not completely lost. Apparently it reduces the oxides contained in the boiler sludges and adhering to the boiler surfaces to lower oxides. Thus the equivalent of a reducing agent residual is provided over and above the boiler water hydrazine residual which is actually measured.

Two methods of feeding hydrazine solution are shown in Figs. 1 and 2. These systems feed and meter a solution containing .02 lb equivalent per gallon and are fabricated almost entirely of type 304 stainless steel.

Hydrazine is purchased as 85% hydrazine hydrate in stainless steel drums and is stored without dilution in polyethylene carboys. This 85% hydrazine hydrate is diluted directly to make the .02 lb equivalent per gallon solution as required. Handling and storing hydrazine solution has not been found to be unduly hazardous in any way.

Method of Analysis

Water samples are analyzed for hydrazine residual by a direct iodate titration, the end point being determined potentiometrically. Sufficient hydrochloric acid is added to the sample container before the sample is collected to make the contents 10% concentrated hydrochloric acid by volume. This stabilizes the hydrazine and makes it insensitive to atmospheric oxygen. An aliquot portion is further acidified with hydrochloric acid to produce a solution 3-5N in HCl and titrated with standard potassium iodate solution.

To provide the required accuracy a microburette capable of measuring the titrant to within .001 ml is used in conjunction with a pH Indicator equipped with calomel and platinum electrodes as shown in Fig. 3. The titration reaction is described by the following equation:

$$N_2H_4 + KIO_3 + 2HCl = KCl + ICl + N_2 + 3H_2O$$

Typical titration curves are shown in Fig. 4. Using this method, hydrazine residuals can be determined with an accuracy of 1 epb by regular laboratory technicians in about 5 minutes.

Hydrazine has been used successfully as a means of preventing oxygen corrosion without producing undesirable side effects and its use does not require unusual equipment or techniques.

Part 2 of a Two-Installment Article

Use of Sea Water in Industry

By A. D. RUST*
Engineering Consultant
The Dow Chemical Company
Freeport, Texas

TABLE 1—GALVANIC SERIES

Arrangement of Metals and Alloys in a Galvanic Series Based on Potenial Measurements in Sea Water. Velocity of Flow = 13 ft per sec. Sea Water Temperature = 77 F

	Volts
Magnesium (H1 alloy)	1.48
Zinc	1.03
Aluminum (Alclad 3S)	0.94
Aluminum 3S-H	0.79
Aluminum 61S-T	0.76
Aluminum 52S-H	0.74
Cast Iron	0.61
Carbon Steel	0.61
Stainless Steel, Type 430 (17% Cr)	0.57
Ni-Resist Cast Iron (20% Ni)	0.54
Stainless Steel, Type 304 (18% Cr, 8% Ni)	0.53
Stainless Steel, Type 410 (13% Cr)	0.52
Ni-Resist Cast Iron (30% Ni)	0.49
Ni-Resist Cast Iron (20% + Cu)	0.46
Naval Rolled Brass	0.40
Yellow Brass	0.36
Munts Metal	0.36
Copper	0.36
Red Brass	0.33
Aluminum Brass	0.32
Comp. G. Bronze (88-10-2)	0.31
Admiralty Brass	0.29
90:10 Cupro Nickel (0.8% Fe)	0.28
70:30 Cupro Nickel (0.06% Fe)	0.27
70.30 Cupro Nickel (0.47% Fe)	0.25
Stainless Steel, Type 430 (17% Cr)	0.22
Worthite (24% Ni, 20% Cr, 3% Mo, 1.75% Cu)	0.21
Nickel	0.20
Stainless Steel, Type 316, (18% Cr, 12% Ni, 3% Mo)	0.18
Inconel (79.5% Ni, 13% Cr, 6.5% Fe)	0.17
Stainless Steel, Type 410 (13% Cr)	0.15
Titanium (Commercial)	0.15
Silver	0.13
Titanium (High Purity from Iodide)	0.10
Stainless Steel, Type 304 (18% Cr, 8% Ni	0.08
Hastelloy "C"	0.08
Monel	0.08
Stainless Steel, Type 316 (18% Cr, 12% Ni, 3% Mo)	0.05
Worthite (24% Ni, 20% Cr, 3% Mo, 1.75% Cu)	0.04

From International Nickel Company publications. Those metals mentioned twice have different potentials for the active and passive state. Basis this table—calomel half cell. To convert to basis CuS04 half cell add 0.075.

HIGH PRESSURE pumping into a high pressure sea water system or locally for a particular process is usually done with horizontal centrifugal pumps. Experience over a long period of time indicates that the most economical specifications for such pumps are:

1 to 2% nickel cast iron casing; S-monel impeller and impeller rings;

Ni-resist Type 2 (20% nickel min.) casing rings; aged K-monel shaft, shaft sleeve and sleeve bearing; and Kingsbury thrust bearing.

A pump to this specification will cost probably twice as much as the ordinary bronze fitted pump, but with continuous operation the return on the added investment will be apparent within two years and possibly in one.

If the design of the impeller is such that it is difficult to get a good S-monel casting, substitute Type 304 or 316 with carbon less than 0.04. If there is some unavoidable cavitation or the usually associated conditions of high speed and high head, 316 alloy with 0.04 max carbon will give better results than S-monel.

Pitted stainless steel pump impellers may be built up with rod similar to the parent metal but with slightly more noble characteristics. An impeller properly built up in this manner and properly polished should outlast a new impeller of the original metal.

Bronze impellers may be built up with phosphor bronze or silicon bronze rod with excellent results. Smoothing of surfaces after welding is important.

Circulation water for surface condensers is pumped with verti-

* Presented before the American Society of Mechanical Engineers at Corpus Christi, Texas. The opinions expressed in this paper are those of the author and do not necessarily reflect the opinions of any other person or of a firm.

TABLE 2—DESIGN, OPERATION, AND MAINTENANCE GUIDES

1. The larger of the exposed areas of metal should be the most anodic. Conversely, very small exposed areas should be cathodic.
2. The effective area of the tubes in heat exchangers exposed to galvanic action may be only 3" to 6" of the tube length near the water boxes.
3. Anodes of an expendable material help to prevent galvanic action. Such devices have been used to protect pumps and large valves as well as water boxes and steel structures.
4. Cast iron or cast steel which has become graphitized may be more noble than G-bronze.
5. There are many reports regarding the failure or success of al-brass and cupro-nickels in *polluted* sea water. Most of these reports are probably reliable but no general conclusion can be made because the term "polluted sea water" can cover millions of sets of conditions, some of them harmful to cupro-nickel and some harmful to al-brass.
6. Velocities in heat exchanger cupro-nickel tubes should be not less than 5 ft per second to avoid possibility of concentration cell corrosion or deposit attack. Velocities which are not sufficient to cause scouring action permit certain small areas of the metal to become anodic to other comparatively large areas of the same metal and thus, causing pitting.
7. Iron added to cupro-nickel 90/10 alloy is beneficial up to 1% and possibly to 1.5%.
8. In operation, velocities in heat exchangers should not be allowed to remain in the area where Reynolds numbers equal 18,000 to 25,000. This would be only about 3 ft per second in a ¾" diameter tube.
9. When specifying metals do not rely on a trade name or commercial term for an alloy. Give the analysis of the metal desired. For instance the term Ni-resist can refer to any one of seven different analyses of cast iron. There are about a dozen varieties of monel.
10. Design for streamline flow as much as possible. Avoid having turbulence at ends of tubes.
11. When anodes are installed in water boxes make sure that they do not cause turbulence. Anodes should be streamlined in shape. Water box areas should be adequate so that the volume of the anodes does not cause choking of the passages.
12. Do not use 18-8 and similar stainless steels for pump shafts or seal rings. You may expect corrosion fatigue in the shafts and crevice corrosion in the rings.
13. Apply caution in using anodes or cathodic protection with copper bearing alloys in unchlorinated water. It will be necessary to have a copper loss of approximately 5 mdd to prevent marine fouling.
14. Do not expect to get accurate results from accelerated corrosion tests. Actual service tests supply the only reliable means of determining the corrosion resistance of a given material under certain conditions. Laboratory tests may help or they may be misleading.
15. Welding repairs on cast plain monel are difficult, and on H and S-monel they are almost impossible. The higher the silicon content the more difficult to weld and repair.

The first installment of this 2-part article, in the September issue, discussed sea water intake and distribution systems. Here the author gives solutions to problems encountered when using sea water in industrial equipment.

cal mixed flow pumps or horizontal centrifugal pumps and the specification given above for centrifugal pumps would be the most economical although not as easy to justify because these pumps would have lower heads and slower speeds. Steel or cast iron water boxes of condensers should not be lined, but after the condenser has been in use for a year or two, they should be protected with magnesium anodes.

Arsenical Muntz metal tube sheets and aluminum brass tubes should give satisfactory service. A high minus head on the discharge side of the condenser will cause more oxygen and carbon dioxide to separate from the water in the tubes and cause impingement or erosion. Design velocities for aluminum brass tubes should not exceed 6.75 fps.

Under conditions where the cooling water is 90 F or over and the condenser has been built for velocities in excess of 7.5 fps it may be economical to use a 90 copper 10 nickel (1% Fe) tube but this tube would probably not be economical for the condition of 7 fps or less and 85 F water.

Pumps and piping to barometric condensers are in the same classes as materials discussed previously. Severe corrosion may be expected in the tail pipes of condensers using sea water unless they are adequately protected with linings.

In addition to normal sea water corrosion there is air and gas entrainment to promote metal loss and rapidly remove any protective products of corrosion which may be formed. In some evaporator installations the carry-over of the

TABLE 3—COST OF LINED PIPE

Estimated costs for a sample assembly of 3,600 feet of lined pipe including eight (8) valves, ells, fittings, flanges, bolts, gaskets, and assembly labor. Overhead, contractors' fees and hangers not included. All prices are on basis of flanged systems:

			Straight Run of 100'	
	Saran	Rubber	Saran	Rubber
2"	$ 5.83	$ 8.40	$ 5.50	$ 7.79
6"	18.20	19.11	16.50	17.36
	Enamel 70-B		Enamel 70-B	
12"	22.30	33.00	19.20	29.54

(All figures are on a cost per lineal foot basis)

TABLE 4—COST COMPARISON OF GATE VALVES

Gate Valves (Solid Wedge I. E. Not Double Disc)	2" SCR.	6" FLG.	12" FLG.	18" FLG.	24" FLG.
1. Ill Iron #475 Scrd.—475½ Flgd.	24.80	78.15	290.15	734.70	1695.70
2. Iron Ibbm #464½ Scrd.—465½ Flgd.	24.80	78.15	290.15	734.70	1695.70
*3. Iron Ibbm Solid Bronze Disc	26.00	94.00	324.00	809.00	1865.00
*4. Iron 1 to 3% Ni Cast Iron Bodies Bronze Trim—Solid Bronze Disc	42.85	146.70	510.00	1241.00	3185.00
5. Iron 1 to 3% Ni Cast Iron Bodies No. 316 Steel Trim	47.10*	161.20	604.50	1364.00	3500.00
*6. Iron 1 to 3% Ni Cast Iron Bodies Monel Trim	49.40	169.20	635.00	1432.00	3675.00
7. Ni-Resist 14 Ni, 2 Cr, 6 Cu Bodies No. 316 Steel Trim	32.45	182.90	805.00*	1818.00*	4700.00*
*8. Ni-Resist 14 Ni, 2 Cr, 6 Cu Bodies Monel Trim	34.45	192.00	845.00	1908.00	4935.00

Courtesy of the Crane Company—Prices of items marked (*) are on a made-to-order basis and therefore, do not reflect regular volume production costs.

products being evaporated will have a pronounced effect on the life of the piping.

The subject of heat exchangers covers a very broad field embracing a great variety of possible conditions most of which are discussed under the heading of corrosion.

Low pressure pumps are usually used to pump comparatively large quantities of water into a distribution system or for pumping condenser circulating water. Recently many, if not the majority of such installations, have been vertical, mixed flow, or propeller slow speed units.

A sample specification for such a pump would be:

1. Suction bell and inlet guide vanes 88 Cu.-10 Sn.-2 Zn bronze.
2. Impeller 88 Cu.-10 Sn.-2 Zn bronze also known as G-bronze. (Note: Not less than 10% tin).
3. Diffusion vanes 88 Cu.-10 Sn.-2 Zn bronze.
4. Bowl 2% Ni-cast iron.
5. Shaft and shaft sleeve K-monel.
6. Column—2% Ni-cast iron or steel (Cast iron first choice).

Corrosion

If pure galvanic action is the only type of corrosion under consideration, then metals selected from a galvanic series similar to Table 1, using the more noble or cathodic metals for the smallest parts and rising in the table to the less noble or anodic metals for parts with the greatest exposed area, should give the best results. In short, avoid designs where the area of the less noble metal is comparatively small.

The problems associated with equipment operating in sea water are not all due to galvanic action, however, and we must also consider erosion, impingement, cavitation, stress corrosion, and last but not least, costs of materials. For instance, Type 304 stainless steel in the passive state is the equal of monel in the galvanic series (Table 1), but in resistance to stress corrosion in sea water, K-monel is superior to 304 by a wide margin. A series of design, operation and maintenance guides will help in explaining the use of metals in sea water (Table 2).

Conclusion

Let us not overlook the calculated risk approach. Many of the design features recommended are costly and this applies especially to metals. It may be most economical to use some design or metals which will not be long lasting and which we expect to replace at frequent intervals.

Many of us have made installations with "baling wire" and "sky hooks" which we considered to be temporary or on an emergency basis. Some of such installations have remained to become permanent, and often contain the essential features of a new approach and a most desirable solution to some old problem.

References and Bibliography

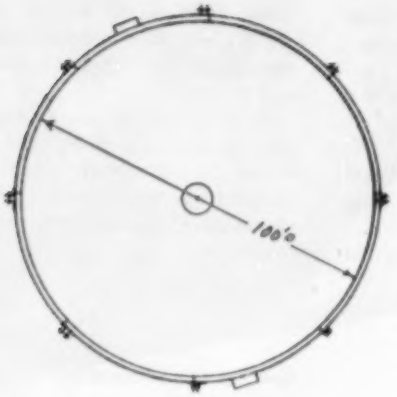
1. *The Oceans* by H. V. Sverdrup, W. M. Johnson, and R. H. Fleming; Prentice-Hall, 1942.
2. *Water* by C. S. Fox; The Philosophical Library, Inc., 1952.
3. *Hydraulic Structures* by A. Schoklitsch, Translation—A. S. M. E. Publication.
4. *Fresh Water from the Ocean* by Cecil B. Ellis; The Ronald-Press, 1954.
5. *Cavitation in Centrifugal Pumps* by A. J. Stepanoff; Trans. A. S. M. E., October, 1945.
6. *Miscellaneous Publications and Reports* by The International Nickel Company.
7. *Longer Service from Heat Exchangers* by J. D. Munro, Standard Oil Development Company; The Oil and Gas Journal, July 26, 1954.
8. *The Corrosion Handbook* by Herbert H. Uhlig; John Wiley & Sons, 1948.
9. *Metals Engineering Design*, A.S.M.E. Handbook, 1953.
10. *Sea Water as an Industrial Coolant* by W. B. Brooks; Petroleum Refiner, October and November, 1954.

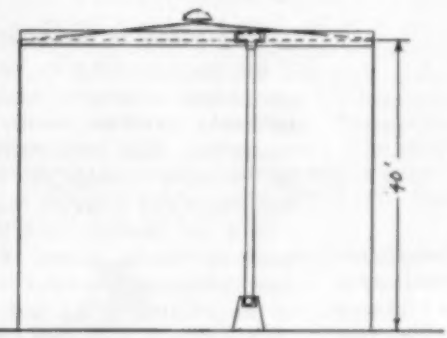
Installing Ball or Roller Bearings

QUITE a number of present modern motors and other equipment have no means of holding ball and roller bearings to the shafts or journals except through a very tight fit.

Unfortunately, most maintenance men will attempt to drive the bearing on its shaft using a piece of pipe, a soft hammer, or steel machinist's hammer. This method does untold damage to the bearing.

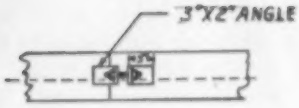
A simple and safe method is to warm the bearing to about 200 F to 215 F in a bucket of 90% water and 10% oil for a few minutes. This expands the bearing and it can be mounted with undue stress. Care should be exercised to dry thoroughly and re-lubricate the bearing after its return to room temperature. This is especially true of sealed bearings.





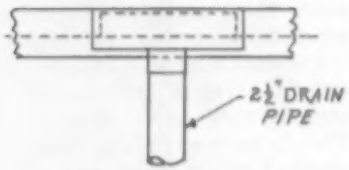
PLAN & ELEVATION OF F.O. TANK WITH ROOF DRAIN INSTALLED

FIG. 1



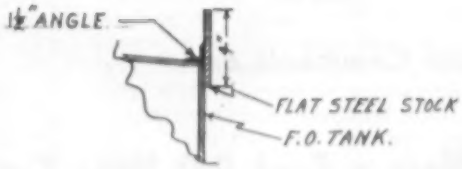
TYPICAL JOINT IN 4" STEEL BAND

FIG. 2



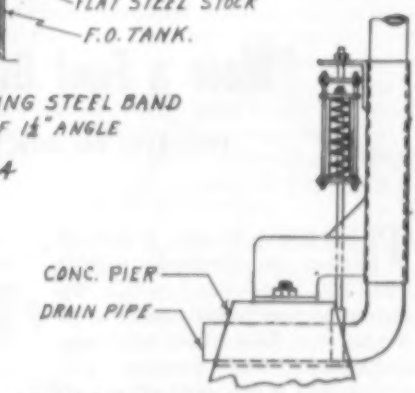
ELEVATION OF DRAIN PIPE AND RECEPTACLE - 2 REQ'D.

FIG. 3



SECTION SHOWING STEEL BAND AND POSITION OF 1½" ANGLE

FIG. 4



DRAIN PIPE SUPPORT - 2 REQ'D

FIG. 5

No welding or cutting . . .

ROOF DRAIN SYSTEM FOR FUEL OIL STORAGE TANK

By J. G. AKINS

Results Engineer
Lake Catherine Steam Electric Station
Arkansas Power and Light Co.
Hot Springs, Arkansas

THE Lake Catherine Steam Electric Station of the Arkansas Power & Light Company is located near Hot Springs, Arkansas. The generating station uses natural gas as its primary fuel with fuel oil as standby. This necessitates the storing of several million gallons of oil on the premises at all times.

This oil is stored in four outdoor, cylindrical steel tanks. Carbon and dust from a nearby processing plant settles on top of these tanks and moisture from dew and rain causes it to flow down the sides producing black streaks on the paint giving the tanks an unsightly appearance. Since frequent painting of these tanks was expensive, the need for a roof drain system was evident. Installation of a drain system posed somewhat of a problem since welding, cutting or drilling was not advisable near the oil storage.

Method Used

The system used consists of a steel band clamped in place around the top of the tank, as shown in Fig. 1, with 2½ in. of the band extending above the top. The band was made up of 20 ft lengths of flat steel stock 3/16 in. thick by 4 in. wide. Two of these lengths were welded together forming 40 ft sections, eight of which were used to encircle the tank. To the ends of these sections a 3 in. by 2 in. angle was welded and drilled for a ⅝ in. stud to form a joint as shown in Fig. 2.

Two metal receptacles were fabricated and welded to the band for removing the water. To the bottom of these receptacles a 2½ in. pipe coupling was welded so that a drain pipe could be attached. See Fig. 3. To the tank side of the steel band short pieces of 1½ in. by 1½ in. angles were welded, as shown in Fig. 4, spaced approximately 3 ft on centers around the periphery and 2½ in. from the top of the

band. These angles form a seat on which the band rests when in place.

The steel band was hoisted to the top of the tank in 8 sections. These sections were joined as shown in Fig. 2, one end of the band was attached to the hand rail at the stair landing and other end was fastened with a chain fall to the other end of the hand rail with the band resting on top of the tank. While one man operated the chain fall the band was worked in place and the joints tightened. The chain fall was replaced with a joint similar to that of Fig. 2. Acme Caulking compound was then applied around the top of the tank to make the band water-tight.

After the band was fastened securely in place the 2½ in. vertical drain pipes were screwed into the receptacles and supported as shown in Fig. 5.

This system of drains has only been in service a short time but it seems to effectively remove the water from the top of the tanks eliminating the smudges produced before.

SP&I Reader Comments on

"How a Fuel Bill Was Cut"

(See SP&I for July, 1955, Page 50)

THE article, by Mr. Harry M. Spring, Jr., entitled "How A Fuel Bill Was Cut," which appeared in SOUTHERN POWER & INDUSTRY for July, 1955, was interesting and well written. This writer would like to review some of the information and offer comments based on his experience with similar problems.

Calibration of the Air Flow Recorder

It is very easy to understand Mr. Spring's concern when he discovered that the relationship between the air flow and the steam flow pens was in calibration for only one steam flow. The writer is certain that the author is aware that the air flow meter calibration must be checked periodically over a range of several steam flows. This check is usually by Orsat analysis of flue gas samples, if it is desired to maintain the correct excess air in the furnace over a wide range of operation.

The optimum air flow meter calibration is usually accomplished while only one type of fuel is being fired. Also, the analysis of that fuel must be consistent with the normal fuel used. The air flow and steam flow pens should also "track" one another during the calibration period. Normal furnace draft, feedwater temperature and preheated air temperature should exist and, equally important, the furnace and gas passes should be free from soot and slag. When the preceding conditions have been met and **verified** and after the flue gas samples have been obtained and analyzed for % CO_2, CO and O_2 at each of the desired steam flows, then the percent excess air may be determined.

The air flow pen mechanism in the steam flow-air flow recorder is actuated by a pressure drop of from three to five inches of water, depending on the size of the boiler and auxiliary equipment. The pressure drop is usually measured across the last pass baffle in the boiler. This pressure drop, other conditions remaining unchanged, is proportional to the gas flow through the boiler. The "drop" can be duplicated for calibration purposes by weights which are usually provided by the manufacturer for this purpose.

The air flow pen mechanism and recording pen should then be adjusted to the correct position on the air flow-steam flow chart.

Following such a calibration, it is always advisable to recheck the completed work by repeating the procedure. Had the subject boiler air flow calibration been checked over the normal range of operation by the preceeding or a similar manner?

Response of the Boiler

Mr. Spring's difficulty with the combustion control equipment strikes a familiar chord. The writer has, also, been confronted by "contrary" combustion control equipment and sluggish boilers.

It is not possible that the apparently faulty steam flow-air flow calibration provides the key to the solution of the lack of response to fuel feed and high excess air?

Perhaps the difficulty, which the author experienced, could have been caused by too rapid response by the draft fans and too thin a fuel bed. In the writer's opinion, with efficient combustion, a "clean" boiler, when furnace draft is maintained stable, with a clean grate and a "live" fuel bed, with preheated air available, and feedwater at the normal temperature, the response of the boiler controls to normal changes in steam demand will be satisfactory. It is assumed that the size of the coal fired is correct and of good quality based on plant experience and design of this particular boiler.

Location of Taps

The writer questions the advisability of permanently locating the pressure drop connections for the air flow meter on the gas side of the preheater at this time. The following reasons explain this point of view:

1. The steam flow-air chart should serve as a record of the operation of the boiler and the excess air main-

(Continued on page 114)

Now WALWORTH *PVC* VALVES and FITTINGS give you the greater protection and longer service of *all-plastic* piping systems!

The new Walworth plastic Valves and Fittings are made of rigid polyvinyl chloride which is non-aging, non-corrosive and non-toxic and has extremely low flammability and high resistance to chemical attack. Walworth PVC products are molded by General American Transportation Corporation. Each product bears the stamp of Walworth's long established engineering skill and reliability — your assurance of safe, trouble-free valves and pipe fittings.

Walworth PVC Y-Globe Valves are designed to regulate the flow of alkalis, acids, inorganic salt solutions and other troublesome fluids commonly found in food, chemical and allied industries. They will give exceptional service at temperatures as high as 150°F and are designed for use with schedule 80 pipe. Other features of these valves include: (1) Three chevron, Teflon packing rings give you a leak-proof seal without binding the stem. (2) No useless threads to accumulate troublesome dirt because no stem threads enter the interior of the body. (3) Snap-on spherical plug with ball-to-cone seating arrangement to assure a tight line-contact seal between disc and seat regardless of any minor inaccuracies in alignment. (4) Full 45° angle of stem with center line of pipe to reduce pressure drop and turbulence. (5) Generously designed flow passage at the valve seat for a more even flow. (6) Back seat design allows repacking when wide open under pressure. (7) Polyethylene bonnet gasket to assure a perfect body-to-bonnet seal.

Walworth PVC Diaphragm Valves come equipped with neoprene discs. Other diaphragms especially suited to your application can be furnished. "R-2" rubber diaphragms are commonly used in systems handling dilute acids and alkalis. "J-1" Teflon diaphragms are recommended for maximum chemical resistance.

Valve design features: (1) No stuffing box or packing to replace. (2) A resilient diaphragm connected to the compressor by a stud assures a leakproof closure on the body weir or valve seat even when slurries or semi-solids are in the line. Diaphragm easily replaced without removing the valve from the line. (3) Streamlined flow area in valve body makes valve self cleaning and allows fluids to flow equally well in either direction. (4) Separation of valve body from the sealed metal bonnet protects fluids from contamination. Fluids contact only the valve body and diaphragm. (5) Completely enclosed metal bonnet protects stem from breakage and distortion.

Walworth PVC Fittings assure uniform thermal expansion of pipe and fitting threads when used on plastic pipe. They eliminate the danger of jammed threads, loose joints and the chance of galvanic corrosion. These screwed pipe fittings are: (1) Designed for use on schedule 80 of plastic pipe. (2) Walls are of uniform thickness accurately molded. Proportions are skillfully worked out in all sizes and types of fittings. (3) Fittings are chamfered to protect the thread and afford easy entrance of the pipe. Long bands provide reinforcement at the points of severest strain.

This booklet contains all the details about Walworth PVC products that you'll want to know. It describes mechanical and thermal properties, working pressures, sizes and dimensions, application and assembly data. For your free copy write to us. Please use company letterhead.

WALWORTH

valves . . . pipe fittings . . . pipe wrenches

60 East 42nd Street, New York 17, N. Y.

WALWORTH COMPANY OF CANADA, LTD.

Toronto • Calgary

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Electrical Q & A

ANSWERS to Questions on Page 48 for Journeymen Electricians

By ROBERT U. GARRETT
Chief Electrician
Oerlikon Tool & Arms Corp. of America
Asheville, N. C.

1. **Accessible:** Not permanently closed in by structure or finish of building; capable of being removed without disturbing building structure or finish.

   Branch Circuit: That portion of a wiring system extending beyond the final overcurrent device protecting the circuit.

   Cabinet: An enclosure designed for either surface or flush mounting and provided with a frame, matt or trim in which doors are hung.

   Device: A unit of an electrical system which is intended to carry but not consume electrical energy.

   Circuit Breaker: A device designed to open under abnormal conditions a current-carrying circuit without injury to itself.

   Hazardous Location: That area, building or premises in which the authority enforcing the National Electric Code considers to be covered by or included in Article 500.

   Raceway: Any channel for holding wires, cables, or bus-bars, which is designed expressly for, and used solely for, this purpose.

   Service Conductor: That portion of the supply conductors which extends from the street main or duct or transformers to the service equipment of the premises supplied.

   Service Entrance Conductor: That portion of service conductors between the terminals of service equipment and a point outside the building, clear of building walls, where it is joined to the outside source of electrical supply.

   Overload Device: A mechanism designed to automatically open or disconnect the circuit from the source of supply when more current than that for which the circuit or current-consuming equipment is designed, is called for.

   Dust-tight: An enclosure so designed that dust will not enter.

   Dust-proof: So designed that an accumulation of dust will not interfere with its successful operation.

   Vapor-tight: An enclosure designed to resist the entrance of vapor.

   Explosion-proof: An enclosure which is capable of withstanding an explosion of a specified gas or vapor which may occur within it, and of preventing the ignition of the specified gas or vapor surrounding the enclosure by sparks, flashes or explosions of the gas or vapor within.

   Hoist-Way: A shaftway, hatchway, well-hole or other vertical opening or space in which an elevator or dumb-waiter operates.

   Feeder: Any conductors of a wiring system between the service equipment, or the generator switchboard of an isolated plant, and the branch circuit overcurrent device.

   Guarded: Covered, enclosed, fenced off, or otherwise protected to remove the liability of contact or approach by persons or objects to a point of danger.

2. **Service Ground:** The neutral wire of a service which is attached by an approved method to the earth via water pipe, driven rod or buried plate.

   Equipment Ground: A conductor effectively connecting the frame, structure or enclosure forming a part of the electrical equipment, to the ground.

   Grounded Line: A current carrying, normally ungrounded, conductor whose insulation has failed and has come in contact permanently or intermittently with the ground.

3. A bare neutral conductor is permitted only in a Service Entrance run.

4. (a) The high leg.
   (b) The neutral, if one is used.

5. (a) Each end of the conduit shall be bonded around the box or flex steel with not smaller than #8 wire and shall have approved bonded fittings.
   (b) Service entrance conductors shall not be spliced except in approved terminating enclosures housing metering equipment, or its equivalent.

6. (a) Where conduit terminates in an enclosure having other than threaded hubs and where lock nuts are required, a lock nut is required on both sides of the enclosure, making double lock nuts.
   (b) Approved insulated bushings shall be used.

7. Theoretically, none. The neutral is supposed to carry only the unbalanced current of the hot legs.

8. See diagrams on page 58.

you've got to be good to stay in front

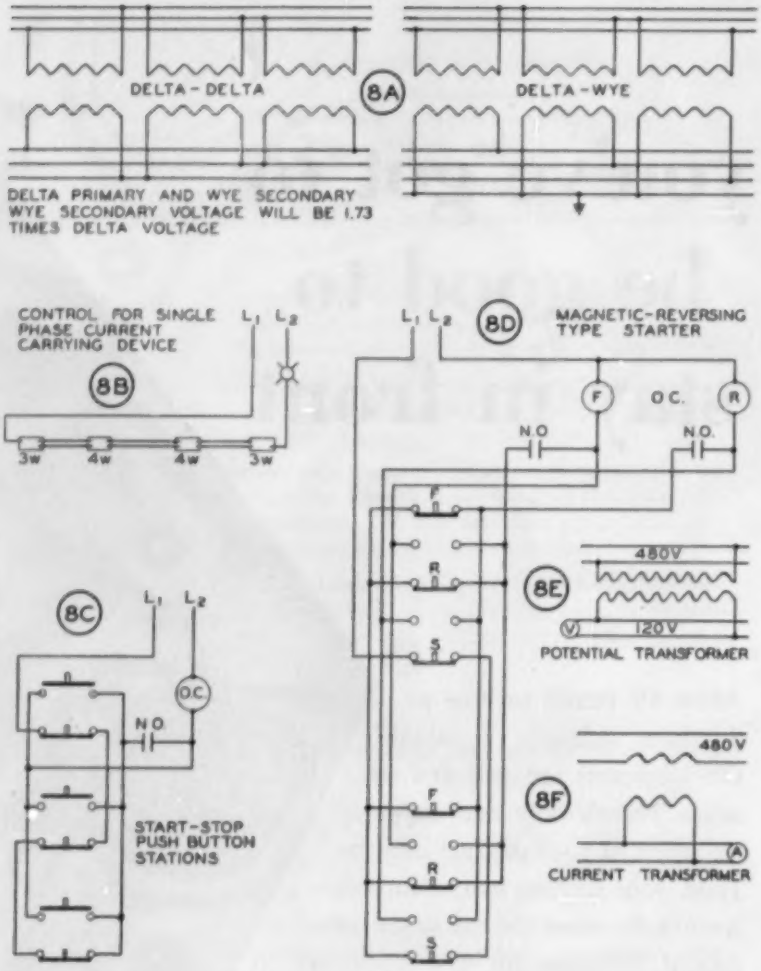
After 69 years' service to Southern industry, Standard Oil lubricants are still *first* in sales. There's only one answer. To stay first your product must be *good*, your services *more than satisfactory*. Standard Oil was first to offer special lubricants for new machinery, and for over half a century these lubricants have been *constantly* improved. So, today, as two generations ago, Standard Oil lubricants still stand as the *finest*. Wherever there are moving parts and friction, in your plant, there are special types of Standard Oil to afford *maximum* protection. Whatever your lubrication requirement may be, there's a Standard Oil lubricant to fit your needs—designed to do your particular job with economy, dependability and efficiency.

STANDARD OIL
LUBRICANTS

The combined facilities for research, testing and engineering behind Standard Oil Lubricants are unequaled.

Standard Oil Company
(KENTUCKY)

Electrical Q & A (Cont'd)



9. (a) Ordinarily, no physical manifestation. The grounded conductor has no potential against the ground and the two remaining conductors have their full potential against the ground. Ordinarily, no untoward condition of the system occurs and such a condition is usually detected by ground lamps or static ground indicators.

   (b) In a Wye system the fuse, breaker or other overcurrent protective device goes into immediate operation, opening the lines.

10. (a) Commonly used in ballasts in fluorescent lighting, motor starting and in other places where a two-winding transformer is not required.

    (b) Commonly used in oil heaters to ignite oil or vapor.

    (c) Commonly used in street lighting (series circuits).

    (d) A method of forcing equal division of load between transformers having considerable difference in impedance characteristics.

    (e) Special transformers using the Scott or similar connections.

    (f) Yes. Three-phase to 2-phase or the reverse.

11. Class I. Div. 1 and 2.
    Class II. Div. 1 and 2.
    Class III. Div. 1 and 2.
    Class I covers locations in which flammable gases or vapors are or may be present in the atmosphere.
    Class II covers locations which are hazardous because of the presence of combustible dust which is or may be held in atmospheric suspension.
    Class III covers locations subject to easily ignitible fibres or flyings or other substances of similar nature but not likely to be atmospherically held in suspension.

12. (a) A 3-phase motor having one leg or "hot line" open, forcing the motor to attempt to run on one phase.

    (b) A term often applied to a synchronous motor attempting to pull into step with the incoming current, and attempting to synchronize.

    (c) Irregularity of the incoming voltage is often the cause; also, excessive excitation will retard starting speed. If swinging or pulsating is excessive, a common remedy is to apply bridges of copper or brass to the poles. The induced current in these bridges tends to stabilize the speed.

13. A megohmmeter, commonly called a "Megger."

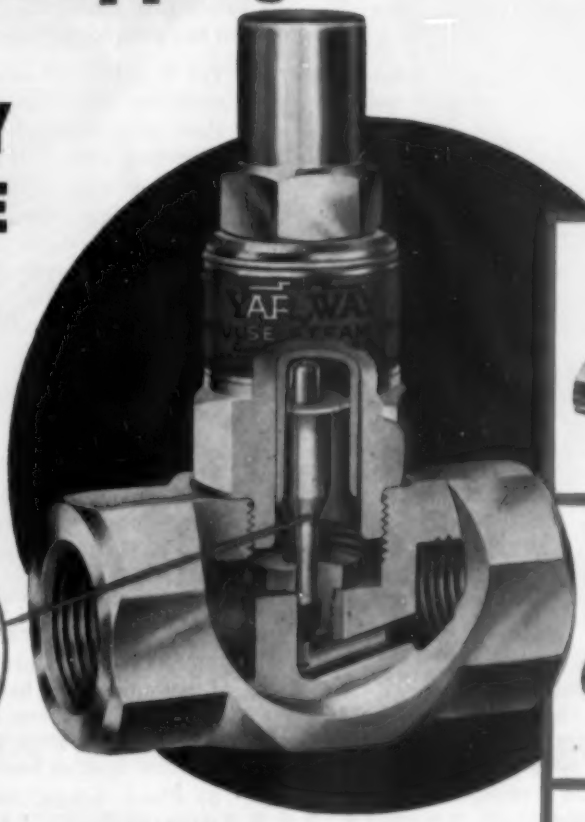
14. Changing the number of poles.
    Varying resistance in the wound armature circuit.
    Shifting brush positions on armature.

15. (a) An ammeter indicates or shows the actual current in amperes flowing in a given circuit, and is connected only in series in the circuit. The wattmeter indicates or shows the power in watts in a given circuit and has two connections: a voltage coil connected in parallel or across the circuit, and a current coil in series with the circuit.

(*Continued on page 60*)

the impulse that revolutionized steam trapping

YARWAY IMPULSE STEAM TRAP



the only moving part

...a small stainless steel valve that literally floats on the condensate load. Gets equipment *hot in a hurry—and keeps it hot!*

SERIES 60 and 120

For all *normal* trap requirements, pressures to 400 and 600 psi.

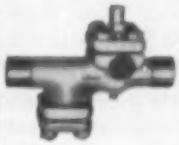
½" No. 20-A

For *light loads* on tracer lines, steam mains, small presses, etc.

SERIES 40

For *heavy loads* requiring extra high capacity steam traps.

INTEGRAL-STRAINER HIGH PRESSURE TRAP



For *high pressures, high temperatures.* (Flanged or welding connections.)

Twenty years ago YARWAY applied a unique theory of thermodynamics to steam traps—and gave industry the amazing YARWAY Impulse Steam Trap.

Today—over a million YARWAY Impulse Steam Traps later—advantages like the following continue to convert new users, and convince old users to standardize on the YARWAY Impulse:

- **QUICK HEAT-UP AND EVEN TEMPERATURES OF EQUIPMENT**
- **GOOD FOR ALL PRESSURES WITHOUT CHANGE OF VALVE OR SEAT**
- **SMALL SIZE—LIGHT WEIGHT**
- **ONLY ONE MOVING PART**
- **STAINLESS STEEL—minimum maintenance**
- **WON'T FREEZE UP**
- **A COMPLETE LINE of sizes and types for every requirement**
- **IMMEDIATELY AVAILABLE from 270 local Industrial Distributors**

For free Trap Selector, or 24 page Bulletin, write

YARNALL-WARING COMPANY
Home Office: 116 Mermaid Avenue, Philadelphia 18, Pa.
Southern Representative: ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

YARWAY IMPULSE® STEAM TRAP

OVER 1,000,000 YARWAY IMPULSE STEAM TRAPS USED

Electrical Q & A (Continued)

(b) The ratio of the true power or watts to the apparent power or volt-amperes, expressed as a percentage, in an alternating current circuit.

(c) Over-excited synchronous motors, and static condensers or capacitors.

16. (a) Bearings and lubrication; current consumption and voltage; mechanical security and operating conditions.

(b) An instrument for alternating current measurement having a "clamp around" device, which registers by induction without having an electrical or mechanical connection to the circuit, i.e. an "Amprobe" or "Clamp-on" Ammeter.

(c) A fuse and voltage tester.

17. Quote: "Each circuit supplying equipment in or on a dispensing pump (used for flammable liquids) shall be provided with a switch or other acceptable means to disconnect ALL conductors of the circuit from the source of supply." N.E.C. 5120(e), (Gas Stations).

18. (a) A circuit whose components have more than one phase of line wires.

(b) Using an ammeter, divide the load as equally as possible between the various phases.

(c) Opening the neutral line causes the 200 watt lamp and the 25 watt lamp to burn in series on a 230 volt circuit. As the resistance of the 25 watt lamp is roughly 8 times that of the 200 watt, the smaller lamp will receive 8 times the current it would normally consume, causing a rapid burn-out.

19. Three characteristics distinguish the synchronous motor from the standard induction motor: 1) It operates at a constant speed; 2) Its power factor is under the control of the operator; and 3) Separate excitation is required. It is supplied with an auxiliary winding to give it sufficient torque for starting and is started as an ordinary motor. As it comes up to speed d-c excitation voltage is applied to its field winding, developing a pulling torque tending to pull the motor into step with the frequency of the circuit. Once in step, it tends to maintain a very constant speed, regardless of load until the over-load limit is reached. It does not slow down as will other types of motors.

(b) The outside source of direct current is usually a motor-generator set, or may be a direct connected d-c generator.

20. When driven by a prime mover, it may be used as a frequency charger or frequency converter.

21. Tag the disconnect open; then check the line for any abnormal visible condition and also to be sure no one else is on or working on the line. When certain the line is in the clear, proceed, as the situation indicates, to determine the cause of the trouble.

22. Tag the disconnect open or, preferably, lock it open.

23. Check the condition of the ladder, including safety feet. Check the rope fall for any apparent bad sheaves or rotten or frayed rope.

24. 1) Try to get a dry and insulated platform or standing place from which to work.
2) Have sleeves rolled down and use gloves if necessary and at all practical.
3) Shield or cover exposed live parts if possible.
4) Always have a companion with you and if possible attach a dry, non-conducting line to yourself so he may pull you loose in case of accident.
5) Take your time and don't be a fast working "eager beaver."

25. (a) See that you are insulated from the ground, if possible. Get some dry, non-conducting material and knock the line loose or push or pull him away from it. Do not touch his body while he is in contact with the hot line, unless you know you are insulated. If nothing else is available, make a loop of your belt and lasso him.

(b) 1) Start artificial respiration immediately and don't get panicky.

2) Lay victim in prone position, on stomach. Elbows bent, one hand on the other, head on hands, face to one side. Check mouth and throat for foreign obstructions. Kneel at victim's head on either or both knees.

3) Place hands, fingers spread, thumbs touching, heels of hands just below a line between armpits.

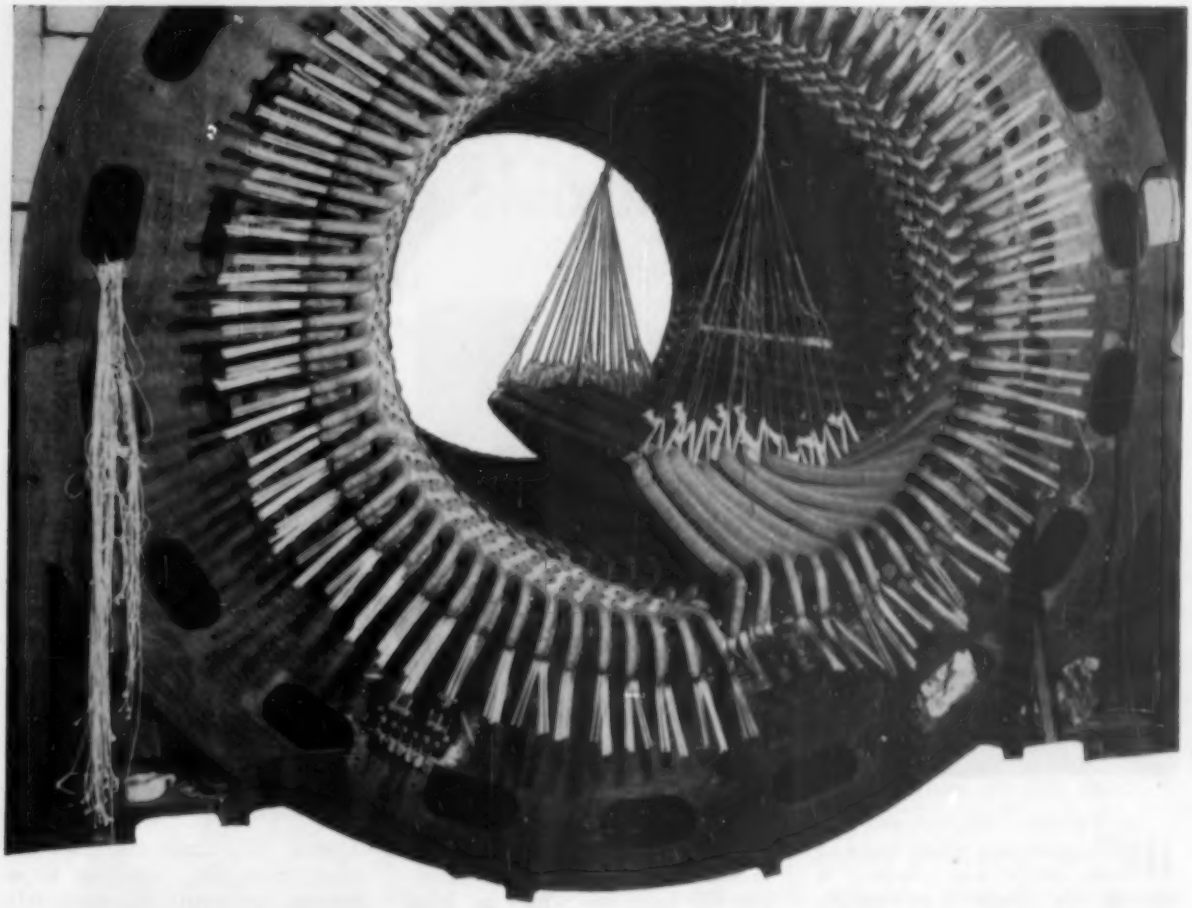
4) Apply pressure by rocking forward slowly until arms are vertical, keeping elbows straight.

5) Release pressure slowly and grasp arms just above the elbows. Continue backward, raising arms until tension is felt for maximum chest expansion. Lower arms to complete cycle.

6) Repeat cycle as near 12 times per minute as you can. Establish a rhythm by saying to yourself slowly: "Out goes the bad air" (completes the pressure movement); "In goes the good air" (completes the release movement); "One-two-three-four" (completes inactive period). Repeat cycle.

7) Send for help. Keep patient warm if possible. Give no stimulants without doctor's orders. Don't give up.

The Editors will welcome comments from the readers on this list of questions and answers.



WHY WESTINGHOUSE REPLACEMENT COILS MEAN BETTER THAN NEW PERFORMANCE

Now! Westinghouse exclusive Thermalastic® insulated replacement coils are available for your motors and generators. Here are new, superior coils that will greatly extend the "new life" you rebuild into your equipment. Here are coils that will upgrade and, in most cases, actually uprate your equipment.

- **Void-free. Impervious to moisture, ordinary solvents, oils, weak acids and alkalies.**
- **Thermal stability, and voltage endurance increased at least 10 times.**
- **Mechanical strength increased more than 30 times; dielectric strength increased more than 20 percent.**
- **Extremely elastic . . . follows expansion and contraction of copper.**
- **Does not deteriorate with age . . . long-time storage of spare coils no problem.**

Westinghouse maintains a network of 38 repair plants strategically located over the United States where Thermalastic windings are applied to motors, 200 hp and up, and generators, 150 kv and larger. Westinghouse Field Service makes thorough and lasting repairs to equipment not conveniently moved from your plant.

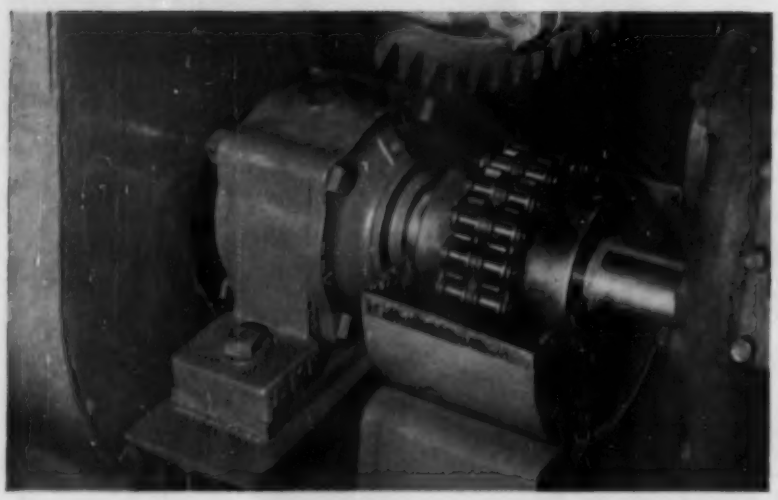
Contact your Westinghouse sales engineer . . . or write Westinghouse Electric Corp., 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

J-95170

YOU CAN BE SURE...IF IT'S Westinghouse

The Work Horse of Shaft Connectors

Chain Type Flexible Couplings



By
H. E. HYLER

Double-strand flexible chain coupling is shown connecting a geared head motor and a pinion gear, driving a sand and gravel dryer. 25 hp is being transmitted at 43 rpm by this Diamond Chain Company coupling.

BOTH roller and silent types of chain can be and are used in making up chain type flexible couplings where it is desired to couple the end of one shaft to that of another.

The coupling itself transmits all power to be transmitted between driving and driven units. One must therefore be certain that the coupling is large enough to handle maximum loads and shocks to be encountered in the particular drive involved. Like any other coupling, the chain type should be used on shafts that have been aligned as perfectly as possible.

When shafts are carefully aligned, a proper chain type flexible coupling will protect against any slight misalignment which may occur due to settling of a building, or to other causes. It is not meant to say that alignment of the two shafts must be absolutely perfect when the coupling is installed, but we do mean it should be as close to perfection as it is possible to bring it without too great an effort.

Manufacturers

Chain type flexible couplings are usually obtainable from manufacturers of roller chain, silent chain, and the sprockets which go with them. There is some difference in the types of sprockets used in such couplings. There is also some difference in chain design as used for such purposes. However, it is obvious that manufacturers of chain drives are in a good position to produce suitable chain-type flexible couplings from an economic standpoint.

Chain type couplings are usually staunch in construction, simple to install, durable and dependable. They are generally found highly efficient in service. The basic idea in their design is really quite simple. Two sprockets, fitted with suitable hubs, are keyed to the ends of the two shafts it is desired to connect. While the two shafts connected are usually the same diameter, this need not be the case, because it is possible to provide two sprockets with the same diameter, yet bore their respective hubs to fit two different diameters of shafts.

Such slight angular and parallel misalignment as unavoidably occurs in installation, in addition to such misalignment as may develop while the equipment is in service, is normally adequately compensated for by such couplings. They will also compensate for shaft end float of electric motors. All parts involved are of steel.

Suitable clearances are provided between the chain and the sprocket teeth to supply enough freedom of movement to take care of misalignment involved. Usually, such flexible couplings can be installed, aligned, and quickly connected without need for any special tools. Removal of the chain will completely disengage the driving and driven units.

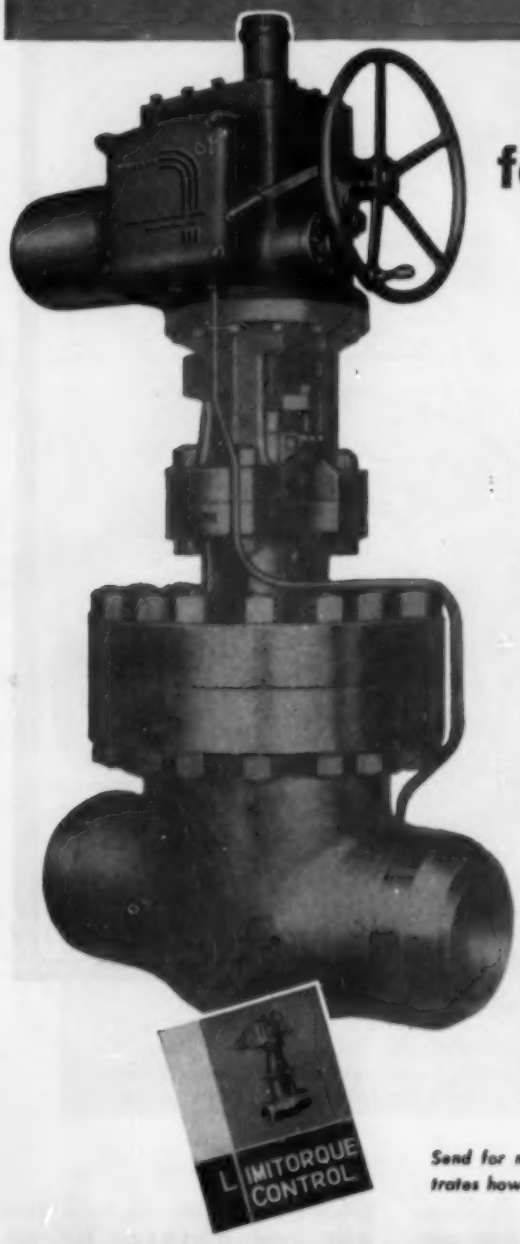
Advantages of Housing

Use of housings or casings for covering chain-type flexible couplings while in service is strongly recommended, and employment of such covers has been on the increase. It is true that roller chain couplings operating in a clean location, and at relatively low speeds, may be used without housings or casings, without any serious reduction in their service life, provided the chain rollers and sprocket teeth are thoroughly brushed

YOU CAN ALWAYS COUNT ON

Limitorque

for Push-Button Operation of VALVES



LimiTorque operates at the mere push of a button—saving time, labor, and money—over manual operation of valves at distant or inaccessible locations. LimiTorque opens and closes valves at the exact speed required, and "limits the torque" applied to valve operating parts, thereby preventing possible damage to valve stems, seats and discs. For safety, the handwheel "cannot rotate" when the valve is being motor operated.

LimiTorque may be actuated by any available power source—Electricity, Steam, Oil, Gas, Water or Air—and is now available for Microwave control.

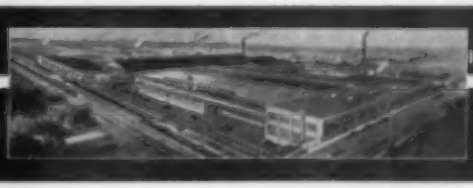
You take no chances with LimiTorque, because these units have been time-tried and tested under the most severe operating conditions for more than 15 years. LimiTorque meets the demands of modern industry for the very best in Automatic Valve Operation.

Serving Southern Industry from Lynchburg, Va. For detailed information, write Virginia Gear & Machine Corp., Lynchburg, Va., or the address below.

Send for new Catalog L-550, which describes and illustrates how and where LimiTorque is used on land and sea.

PHILADELPHIA GEAR WORKS, INC.

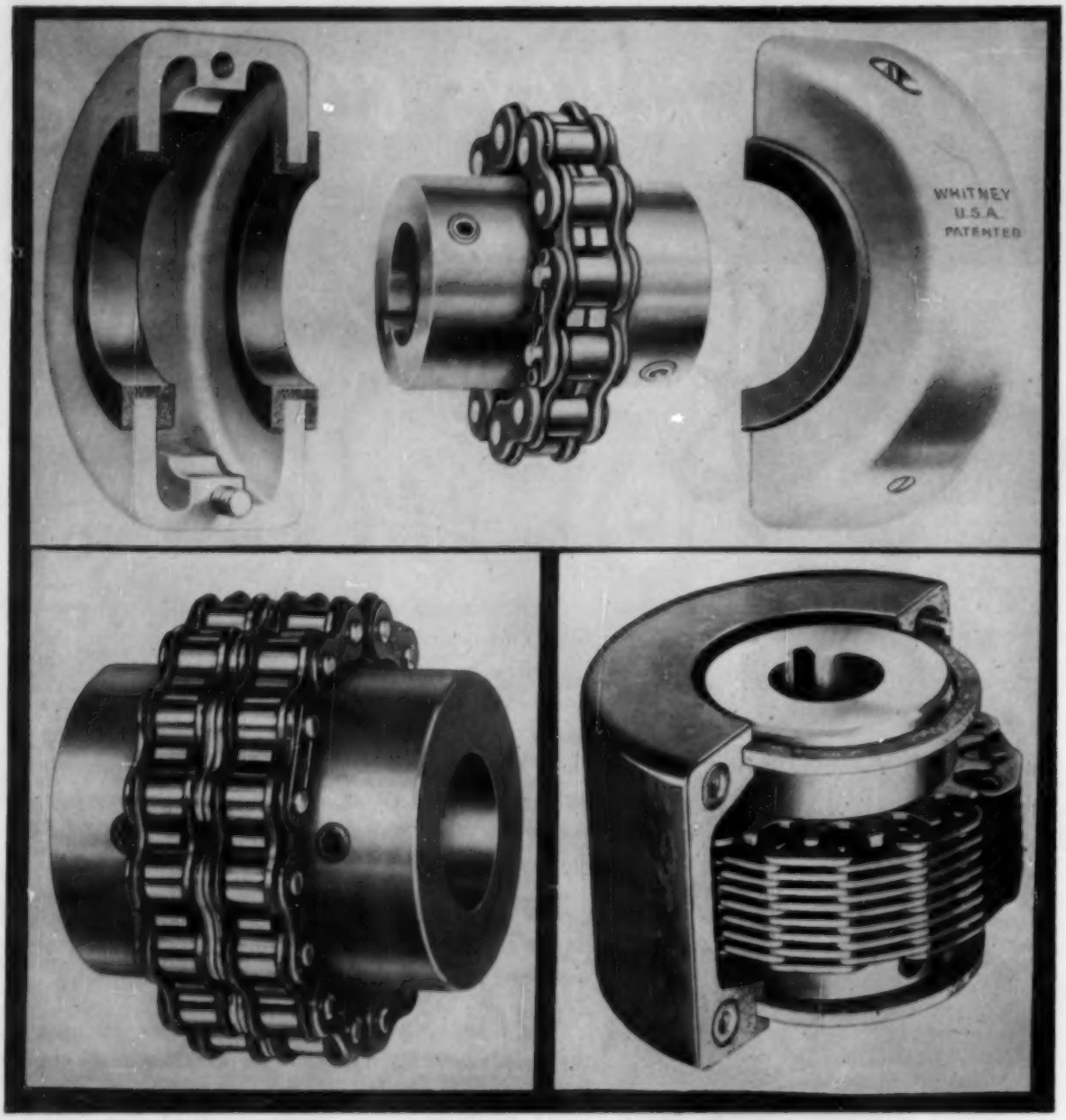
ERIE AVE. & G ST., PHILADELPHIA 34, PA.
NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.
BALTIMORE • CLEVELAND
LimiTorque Corporation - Phila.



Industrial Gears & Speed Reducers

LimiTorque Valve Controls

Established 1892



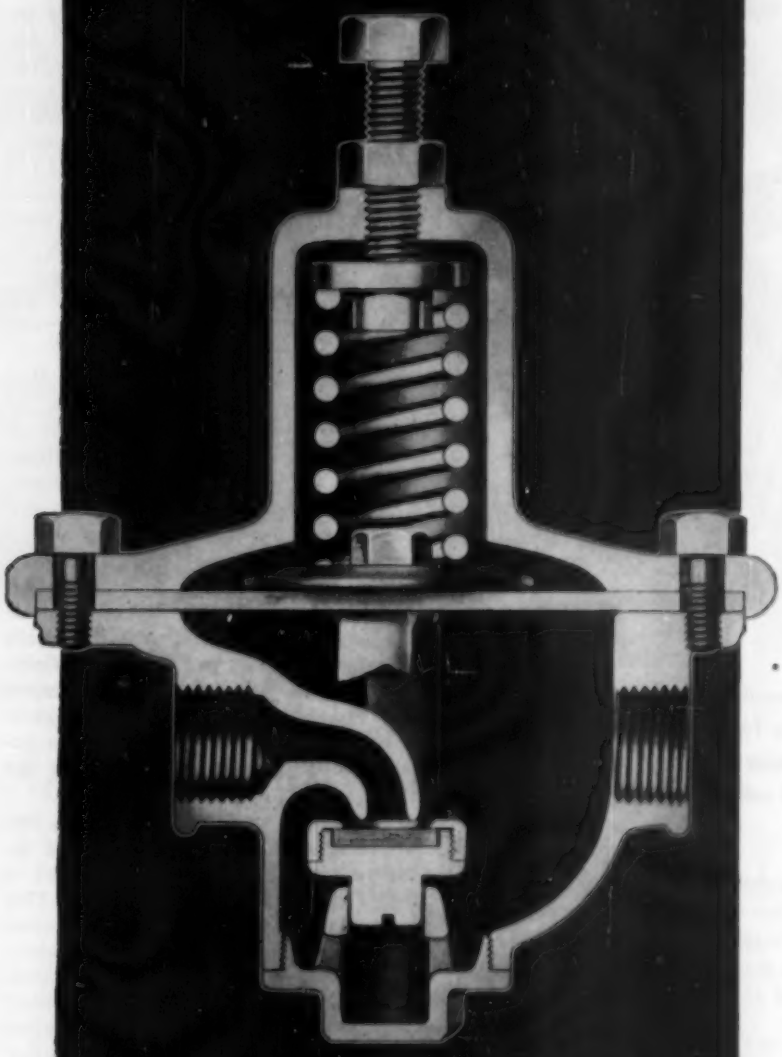
One of the important features of the chain-type coupling is its simplicity of design. The single strand chain, as shown in the photo, was manufactured by the Whitney Chain Company. Lower left photo shows a dependable type of double-strand roller-chain coupling manufactured by Diamond Chain Company. The flexible coupling of silent-chain type seen at lower right, together with its casing, is by Morse Chain Company.

approximately once each week with a good quality of ball bearing or roller bearing grease of medium consistency.

However, couplings operating under abrasive or moist conditions, regardless of their speed, also all couplings operating at higher than ordinary speeds, should definitely be enclosed in grease retaining covers, unless by chance they operate in equipment housings where they are automatically lubricated. Otherwise, a substantial reduction in service life must be expected of them. Such covers are smooth and make for greater operator safety.

Some leading manufacturers of chain-type flexible couplings provide them in three different groups. One of these is a stock-type silent chain coupling. Another is a heavy-duty type, made to order for the particular service involved. The third type is a double roller chain coupling. There is a wide range of stock sizes and

MASONEILAN No. 227
FOR WATER



Stabilizes

Pressure and Flow

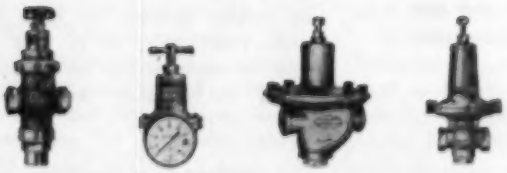
Ideal for either domestic or industrial water lines, Masoneilan No. 227 keeps water pressures stable without cutting down on flow. Stops vibration — reduces strain on plumbing. Eliminates "singing" and spurting from fixtures.

Little or No Maintenance

Built to exceptionally rugged standards, a Masoneilan No. 227 requires little or no maintenance. The heavy-duty fabric reinforced rubber diaphragm lasts indefinitely. Renewable composition disc valve insures tight shutoff. Sturdy bronze body resists corrosion.

Available for initial pressures up to 150 lbs., reduced to pressures between 10 and 120 lbs. Sizes from ¼" to 2". For more information, see your local Industrial Distributor or write Mason-Neilan Regulator Company, 1206 Adams St., Boston 24, Mass.

ALL HIGH Q PRODUCTS



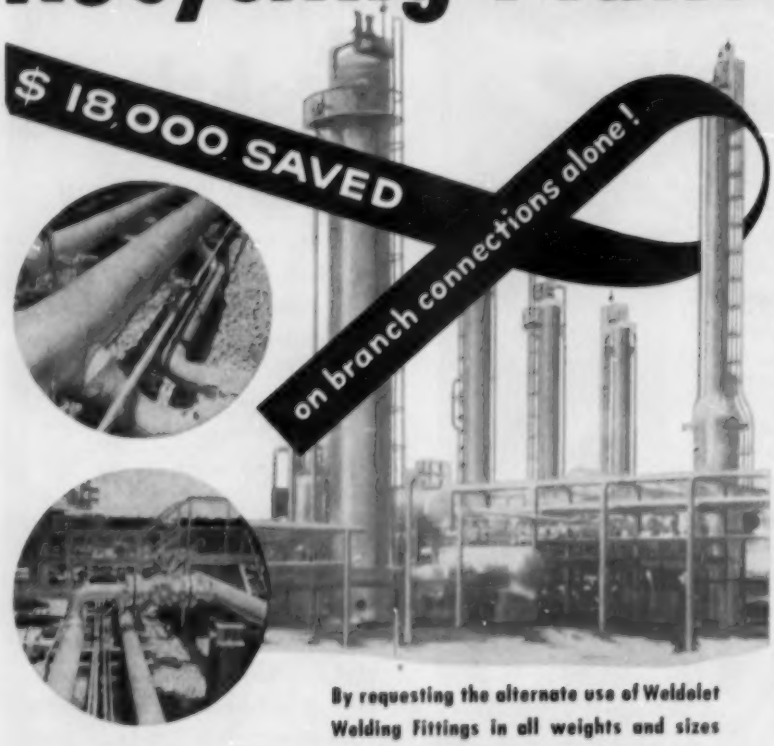
No. 11 for steam No. 71 for air No. 227 for water No. 33 for steam

Order from your Mason-Neilan Distributor.
Use his experience. Save work, save time.

MASONEILAN REGULATORS

Keep Pressure Under Control!

4500 psi Recycling Plant



By requesting the alternate use of Weldolet Welding Fittings in all weights and sizes the piping contractor was able to lower his bid sufficiently to be awarded the job!

This recently completed recycling plant in Louisiana was designed and engineered in full accordance with the ASA and ASME Codes and operates at a maximum pressure of 4500 psi and 225°.

The piping engineers on this job were confronted with a number of tough problems. The plant was to be operated at extremely high pressures. The terrain was swampy which meant the fittings had to withstand the additional stresses exerted by a settling foundation. The piping also had to stand up under rugged vibration conditions. The many design features of Weldolet Welding Fittings in both full size and reducing size outlets provided the safe, practical and most economical answer to these knotty service problems.

WELDING FITTINGS DIVISION

BONNEY FORGE & TOOL WORKS

740 MEADOW STREET, ALLENTOWN, PENNA.

standard bore diameters, to provide easy selection of the proper coupling for nearly any application.

Space Required

One highly interesting aspect of a chain coupling is that it may be installed in a small amount of space, and eliminates difficult assembly problems sometimes encountered with other types of couplings. Because there are many contact points between the chain links and the sprocket teeth, the load to be carried is so distributed that unit stresses are very small. The chain links flexibly hold the chain pins in such a way that the load is divided properly, each pin carrying its own share, even when slight misalignment is present.

Any chain-type flexible coupling can be readily disconnected by simply taking the chain apart at one point and unwrapping it from the sprockets. In addition, couplings of silent chain type may also be disconnected by moving either of the two sprockets endwise out of mesh with the chain. In addition to the possibility of connecting shafts of different diameters as previously mentioned, it is also possible to connect the threaded end of one shaft with the plain end of another, by the simple expedient of internally threading one of the two sprocket hubs.

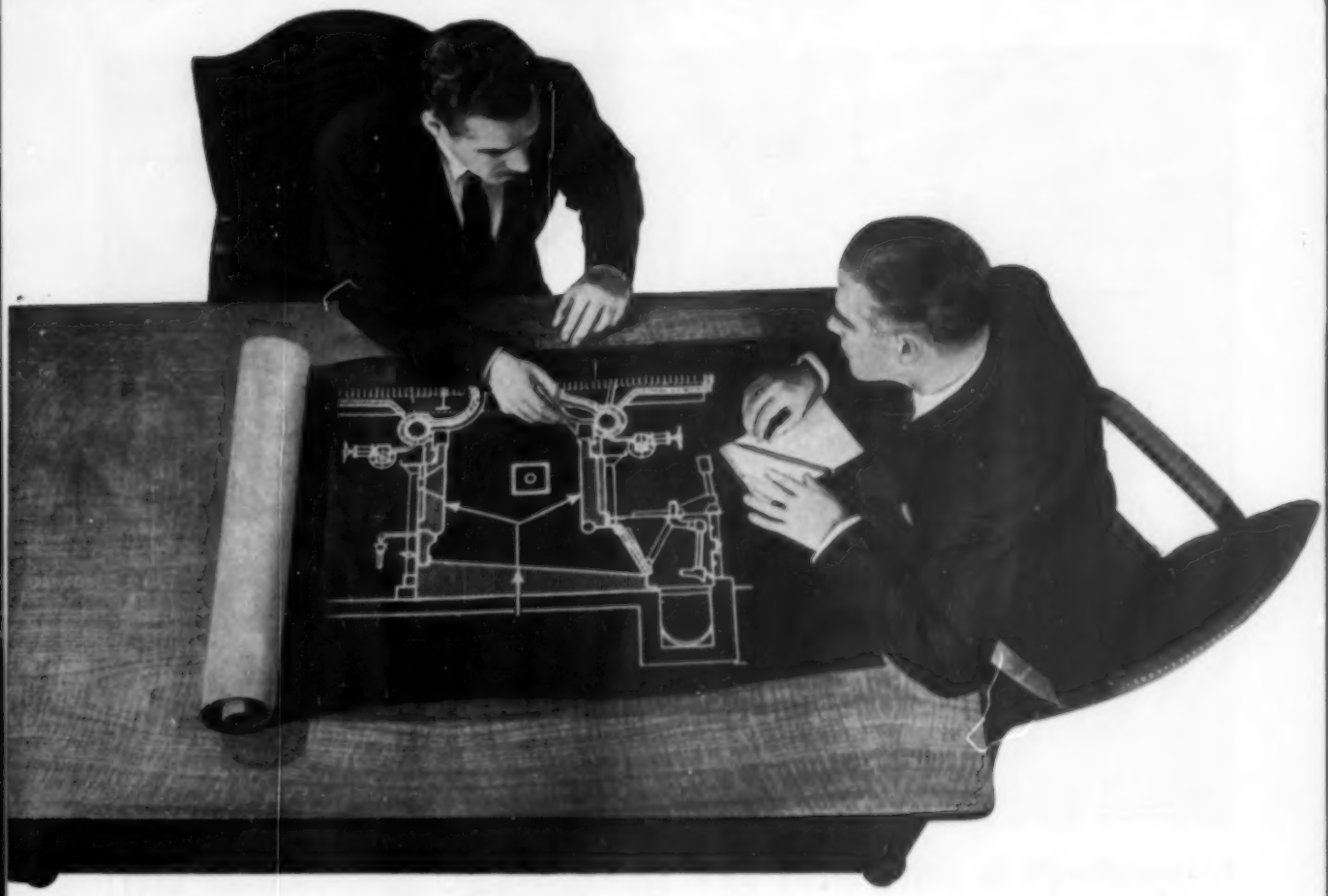
There are also cases where two chain-type couplings are used together, but are separated by a shaft or sleeve between them. This allows compensating for greater misalignment. Some roller-chain couplings are designed to make use of a two-strand roller chain, in which but one pin is required to fasten the chain ends together.

One very fine roller-chain coupling is possessed of out-of-the-ordinary design, in that it incorporates divided rollers, there being two rollers carried on each pin. Aside from this, it is just the same in construction as a single-strand chain made with longer pins.

Adjustment Feature

The rollers, being divided in the manner mentioned, automatically

(*Continued on page* 113)



PROMINENT PUBLIC UTILITY

Cuts ashpit maintenance with B&W Refractory Concretes

A trial installation of B&W Refractory Castable "A", a 2600 degree refractory concrete, was made in one boiler ashpit. To date this castable has given 25 months more maintenance-free service than the refractories previously used.

Results of this first trial were so encouraging that another ashpit, shown in the drawing above, was lined with B&W Refractory Castable "A". In this installation the two opposing high velocity water sprays cut refractories life two ways. First, water splattered on the hot walls (about 1800F) caused spalling. Second, the high velocity water jets had an abrasive effect on the floor refractories.

Here's the report: "After 20½ months service, B&W's Castable "A" lining was still in excellent condition—far superior to the refractories used before."

On the basis of these trials three other boiler ashpits have been lined with this 2600 degree castable.

In addition to ashpit linings, B&W Refractory Castable "A" is widely used in boilers for baffles, hearths, door linings, special shapes, repairing eroded brickwork and forming pier walls in stoker-fired boilers.

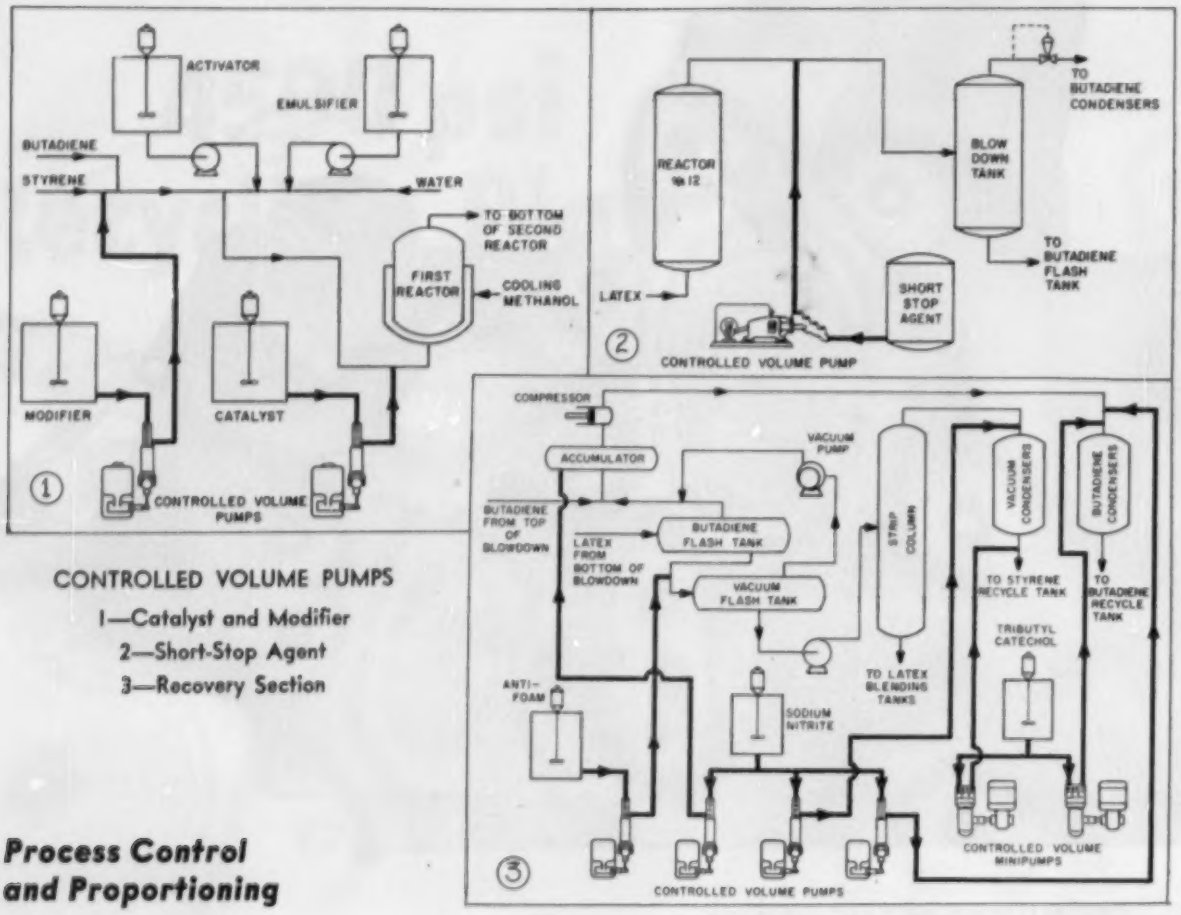
B&W Castable "A" is only one of a line of B&W Refractory Concretes which cost-conscious boiler operators are putting to increasing use in many different applications. These B&W Concretes may help you cut installation costs and lengthen furnace life. Consult your B&W Field Engineer.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST. NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

B&W REFRACTORIES PRODUCTS—B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick B&W Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment . . . Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings

R4705



CONTROLLED VOLUME PUMPS

1—Catalyst and Modifier

2—Short-Stop Agent

3—Recovery Section

Process Control and Proportioning

Controlled Volume Pumps in Rubber Plant

CONTINUOUS polymerization of rubber demands proper control of the process and product quality through accurate metering of several low capacity chemical flows — modifier and catalyst to the reactor, short-stop agent to the latex as it leaves the reactor, anti-foam agent and polymerization inhibitors in the recovery section.

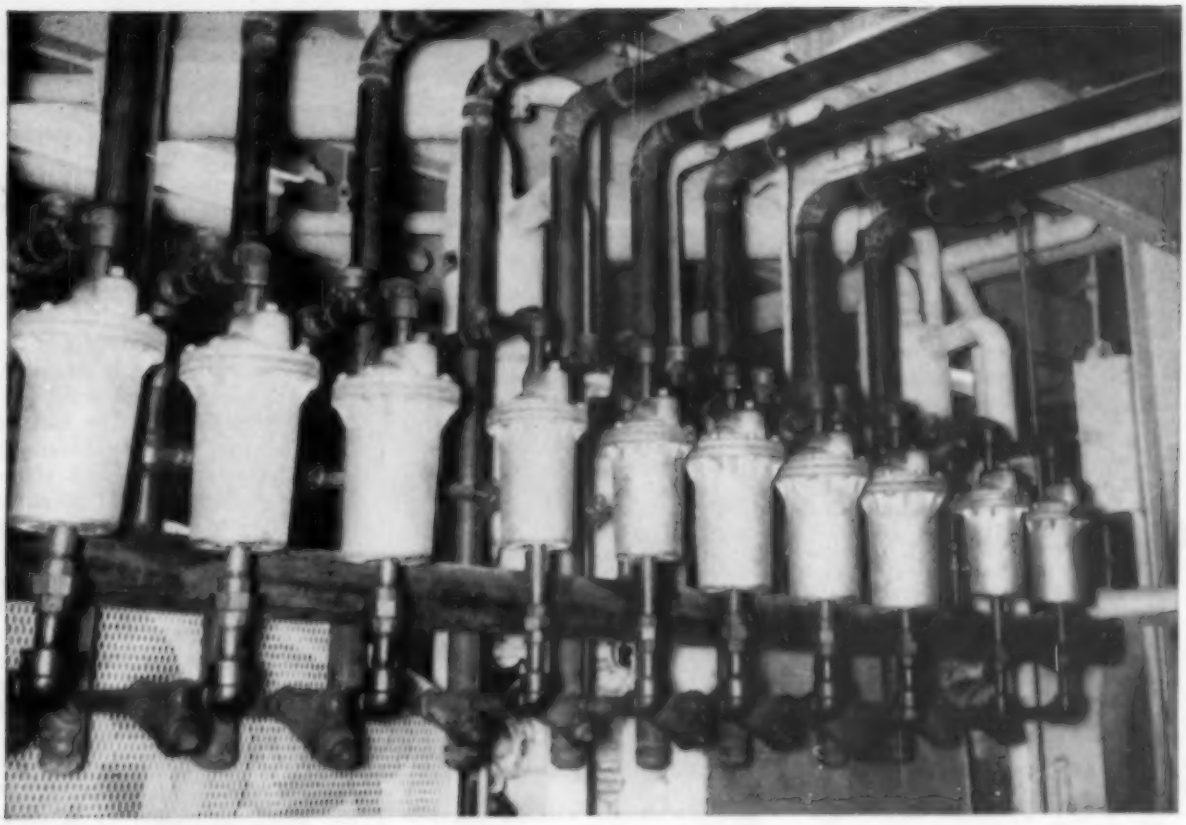
The first of these low capacity flow control problems is encountered in the loading of the first reactor. Flows of butadiene, styrene and soap solution are closely controlled by flow meters. As illustrated in Fig. 1, however, the flows of catalyst and modifier are regulated by means of constant speed Milton Roy Company controlled volume pumps, which are set to maintain the proper ratio of these materials.

The importance of close control of catalyst lies in the fact that any variation in concentration of this material will affect reaction rate and therefore the molecular weight and properties of the final product. The correct amount of modifier assures that the finished latex will have the desired average polymer chain length, another condition affecting product properties.

The reactants are polymerized in twelve glass-enameled reactors equipped with cooling jackets and agitators. Temperature control is closely maintained in all twelve reactors, with the latex product finally discharging from the top of the last reactor.

The latex is then pumped to blow-down tanks where a short-stop agent is added by means of a controlled volume pump, to inhibit further polymerization (Fig. 2). Close control of this material is required since an insufficient quantity would result in continued polymerization of the latex, with adverse effects on product quality. An excess of short-stop agent, on the other hand, is costly.

Additional low capacity flow control problems are encountered in the recovery section. After blow-down, the latex is flashed to



Tip on Choosing Steam Traps: Run Tests with a Pyrometer

Bottom inlet-top outlet traps in six sizes, ½" to 2" connections; 950 to 20,000 lbs/hr capacity.

Side inlet-side outlet traps in five sizes, ½" to 1¼" connections; 680 to 6700 lbs/hr capacity.

Integral strainer traps in three sizes, ½" and ¾". Cost less than trap and separate strainer, save fittings and labor.

A common problem—Traps on Rogers spray driers at Rochester Dairy Company, Rochester, Minn., required frequent servicing—used up about two months of one man's time annually. And, then, within about 30 days after trap servicing, drier temperatures would be 100 degrees below steam temperature. Nobody has to put up with such trap troubles!

Take a tip from this solution!—Henry T. Maass, Building and Utility Supt., took action. He ran extensive pyrometer tests on his driers, using different makes of traps.

100° hotter!—The driers are now equipped with Armstrong inverted bucket steam traps. Temperatures correspond to steam pressure—100 degrees hotter than before. Maintenance?—negligible. Rochester carries $63.31 of Armstrong trap parts in maintenance store against $873.52 in parts for another make of traps that haven't been replaced yet.

Moral—A small investment in Armstrong steam traps can make a world of difference in performance of production equipment and in cost of maintenance. Call your local Armstrong Representative, he has the products and the experience and the ability to be of real assistance.

FREE CATALOG

The 44-page Steam Trap Book is "the handbook of steam-trapping". Selection, installation, maintenance, capacities, data, prices, tables, charts, useful material—yours for the asking without any obligation. Also see data in Sweets or Chemical Engineering Catalog.

Armstrong Machine Works
806 Maple Street, Three Rivers, Michigan

Application Engineered

ARMSTRONG STEAM TRAPS

"Electricity and Electrical Power"

Basic information on the fundamentals of electricity for the first time available in ONE Volume!

A limited edition of this important handbook has just been printed and is available to subscribers to SOUTHERN POWER AND INDUSTRY only. Order your copy NOW with a new or renewal subscription to this magazine.

A series of seven articles, "Electricity and Electrical Power" by Roy W. Wages, industrial engineer for Georgia Power Company, was published last year in SOUTHERN POWER AND INDUSTRY and received wide attention and favorable comment from plant engineers in the South and Southwest.

Demands for reprints of this series became so great that we have had all the articles bound in one volume. This useful 72-page book is now available to SOUTHERN POWER AND INDUSTRY subscribers exclusively.

In simple, practical terms, Mr. Wages makes clear the mysteries of electricity all the way from explaining and defining a volt to a discussion of the sine curve of alternating current motors. The book is liberally illustrated with diagrams and pictures which help make the text crystal clear. Throughout the pages, the author does everything possible to simplify the presentation of facts for easy study and understanding.

Here is a book you will want to keep for reference and for training periods. Pocket sized, it is convenient to carry anywhere . . . for checking right on the job.

All you have to do to own this valuable booklet is to check the coupon below now, and send it back to us. For three dollars, you get a three-year subscription to SOUTHERN POWER AND INDUSTRY *plus* "Electricity and Electrical Power"!

The editors will welcome you into the growing family of SOUTHERN POWER AND INDUSTRY readers.

Yes! I accept your invitation. You may enter my 3-year subscription to SOUTHERN POWER AND INDUSTRY and send me my personal copy of Electricity and Electrical Power at the special combination rate of $3.00.

☐ Enclosed find $3.00 ☐ Send bill for $3.00

NAME .....

ADDRESS .....

CITY ..... STATE .....

CLASSIFICATION DATA

If an individual give name of firm connected with and title of position.

Firm ..... Position .....

Products manufactured
or nature of business .....

Enclose coupon with remittance. If you want to be billed, send coupon alone.

SOUTHERN POWER & INDUSTRY

806 Peachtree Street N. E. Atlanta 5, Georgia

remove unreacted butadiene (Fig. 3). It is then steam distilled under close vacuum control to remove unreacted styrene, following which the latex flows to large storage and blending tanks.

In this section, two Milton Roy controlled volume "miniPumps" meter and inject tertiary butyl catechol into the butadiene condensers and styrene recycle tank. The optimum amount of this material inhibits polymerization of the monomers. An excess of inhibitor, on the other hand, adversely affects polymerization. The rate of addition (10% solution of tertiary butyl catechol in styrene) maintains a concentration of 25 parts per million in the butadiene and 10 parts per million in the styrene.

Three additional controlled volume pumps are used to meter and inject a ten percent aqueous solution of sodium nitrite into the vacuum condenser (8 gallons per day), butadiene condenser (61 gallons per day) and butadiene accumulator (30 gallons per day). The volumes specified are the minimum quantities of solution required to inhibit the formation of "popcorn" polymer, a troublesome product resulting from vapor phase polymerization.

The final controlled volume pump meters and injects a defoaming agent into the vacuum flash tank, thereby preventing excessive foaming during the flashing operation in which butadiene is removed from the unstripped latex. The optimum concentration of defoamer, accurately maintained by the controlled volume pump, ensures efficient defoaming with minimum use of chemical.

KEEP UP-TO-DATE

USE SPI

READER SERVICE

See Pages 16-19

PHYGON-XL is a low-cost and effective control for the most troublesome nuisance organisms in water—Algae.

Algae in an industrial water system can have far reaching effects on acidity, on outlets, inlets, filters and pipes in a distribution system. Use Phygon-XL to eliminate these troublesome factors. Added directly into the system at a rate of four pounds per million gallons of water, PHYGON-XL reduces over-all purification costs and the frequency of cleaning or back-washing filters.

Using PHYGON-XL to suppress blue-green algae blooms in lakes, ponds and reservoirs, also provides an opportunity for the vigorous growth of helpful aquatic plants. It can be mixed with water and applied as a spray over the area to be treated—about one half pound to one pound of Phygon-XL for blue-green algae, and five pounds for green algae per acre of water surface.

You'll find PHYGON®-XL is: effective, easy to use, and inexpensive. Write, wire or phone us if you are unable to locate an immediate source of supply.

Naugatuck Chemical

Division of United States Rubber Company
Naugatuck, Connecticut

US RUBBER

producers of seed protectants, fungicides, miticides, insecticides, growth retardants, herbicides: Spergon, Phygon, Aramite, Synklor, MH, Alanap, Duraset.

Humidity Control in Comfort Cooling

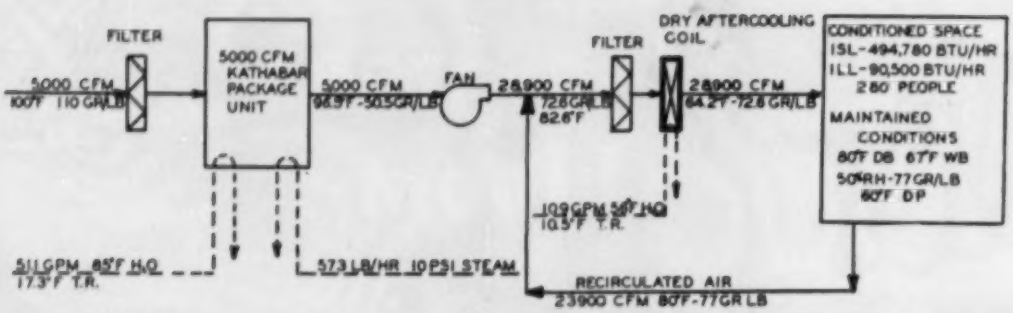


Fig. 1. Schematic flow diagram, based on maximum design conditions, shows the air volumes, temperatures and humidities at various points of the entire system. Utility requirements are also shown.

THE DESIGN of the air conditioning system for the five-story building of the United States Fidelity and Guaranty Company in Oklahoma City was based on strict owner requirements. The system was to maintain the specified comfort conditions during the six month long cooling season found in Oklahoma City despite fluctuations in internal loads or varying outside weather conditions.

Air distribution had to be so designed that encroachment on rentable floor space would be held at a minimum. System control was to be simple and automatic. Sufficient ventilation air should be used, but with the major portion of the air recirculated. Zonal control must be employed. Sensible cooling should be by chilled water.

Equipment choice would be based on an analysis of performance, costs, operational characteristics and flexibility to meet varying day-to-day demands.

Simplified Distribution

With these requirements in mind, a low velocity, parallel distribution system was designed. Supply and return risers are located on each floor in a central service space which also encloses the chimney stack, conditioned fresh air supply

By WM. J. COLLINS, Jr.
Collins and Gould
Consulting Engineers
Oklahoma City, Oklahoma

duct, and building service lines. On the second and fourth floors this area contains main air distribution fans, recirculated and conditioned fresh air mixing plenums, automatic viscus filters, and cooling coils. This space, on the alternate floors, since only booster cooling coils are needed there, is used by office personnel as lunch rooms.

Ducts for both supply and return air are enclosed within a false ceiling which is 2½ ft high. Air diffusion is through Agitair, draftless-type outlets. Supply air is diffused through the outside rings of these outlets. Return air is picked up through the center rings. Duct runs service each private office, branching from a central run which goes the length of the building.

Air is not recirculated from the corridors, lounges, stairwells, or basement area. Each lounge is equipped with a separate exhaust fan.

The building is roughly 60 ft x 115 ft. As the basement is also included in the system, the area conditioned is about 41,400 sq ft. Ceiling height is 9′ 0″.

System Selection

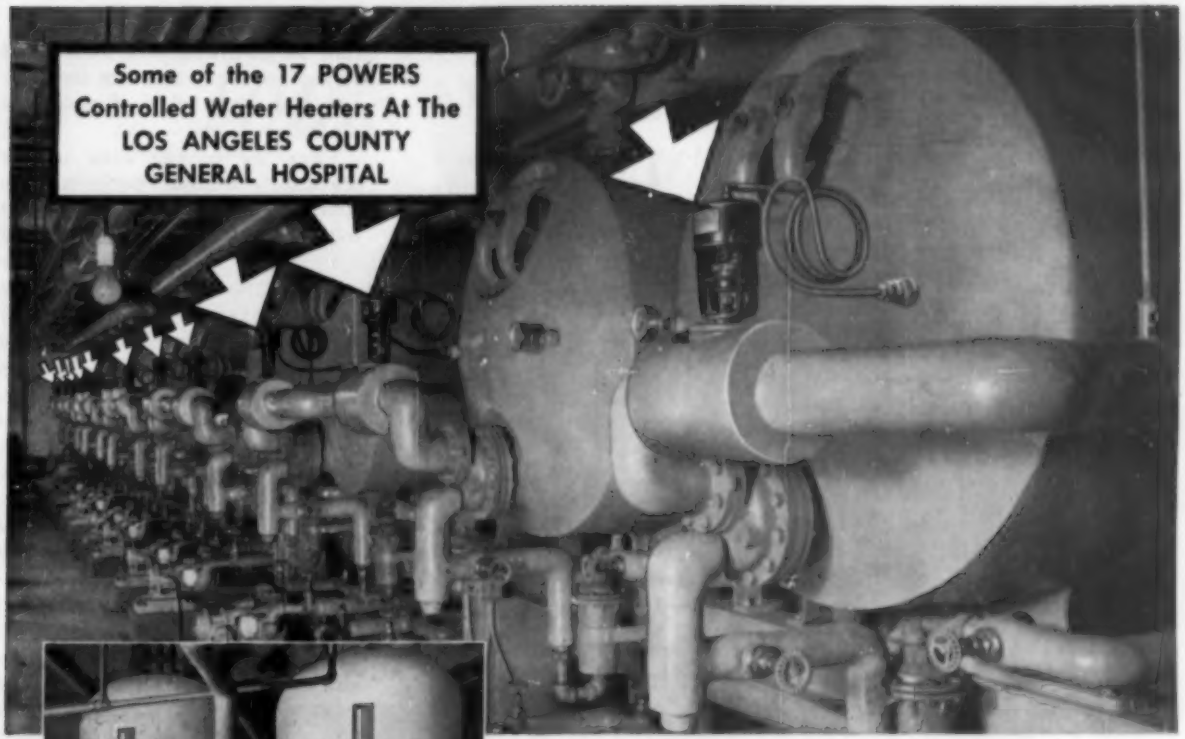
Two systems, refrigeration and chemical - type dehumidification, were considered on the basis of performance, first cost and operating costs, operational characteristics and system flexibility. The chemical - type dehumidification system was ultimately chosen and a Kathabar Humidity Conditioning system, manufactured by Surface Combustion Corporation, was installed.

This system is able to subdehumidify the primary air, using cooling tower water at 85 F. The Kathabar system uses low pressure steam for regeneration. The steam is generated in the summer-time by the same gas-fired boiler which provides the domestic hot water. Operating costs of this system are lower than refrigeration would be. First costs are comparable.

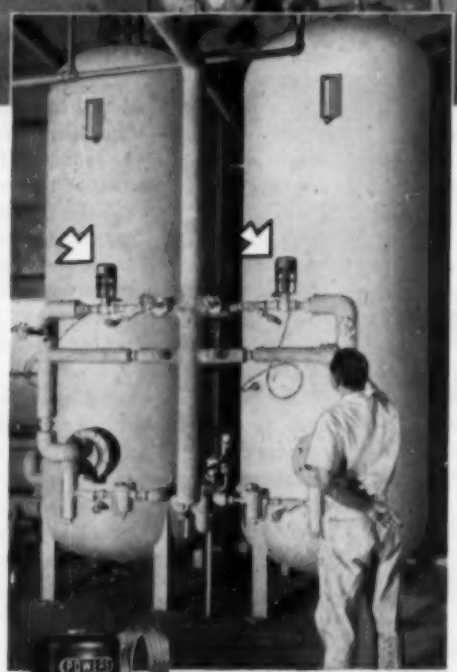
A wide range of automatic turndown with the Kathabar system provides flexibility needed to meet increased or decreased demands. Steam and water usage in the unit parallel demand.

Air Flow Diagram

Shown in Figure 1 is a flow dia-



In 1933 Howe Bros., Contractors, Installed 15 Powers Regulators here. All are still in operation, only 11 are shown in photo above.



Above: 1955 installation of Powers Controlled Water Heaters in Contagious Disease building. Contractor: E. Willardson Company.

"after 22 Years of good service

POWERS **No. 11 Self-Operating TEMPERATURE REGULATORS**

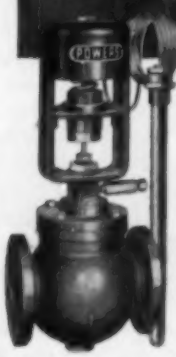
are still giving dependable control"

Reports Mr. Louis J. Koch, Senior Master Mechanic

Performance records like this are not unusual with Powers regulators. With today's high cost of maintenance Powers time proven QUALITY controls are a more profitable investment than ever before.

More POWER$ to You—when you want thermostatic control for water heaters, heat exchangers, heating and air conditioning systems or processes.

Automatic control pays big dividends . . . *IF* you have the right type of control and proper size valves for your requirements. Make sure, call POWERS nearest office for help with your problems.



(c48)

POWERS No. 11 Self-Operating TEMPERATURE REGULATORS
Give Better Control • Last Longer • Save More Money

THE POWERS REGULATOR COMPANY

SKOKIE, ILLINOIS | *Offices in chief cities in U.S.A., Canada and Mexico*

Over 60 years of Automatic Temperature and Humidity Control

1333 SPRING STREET, ATLANTA, GA.—101 W. ELM STREET, GREENSBORO, N. C.

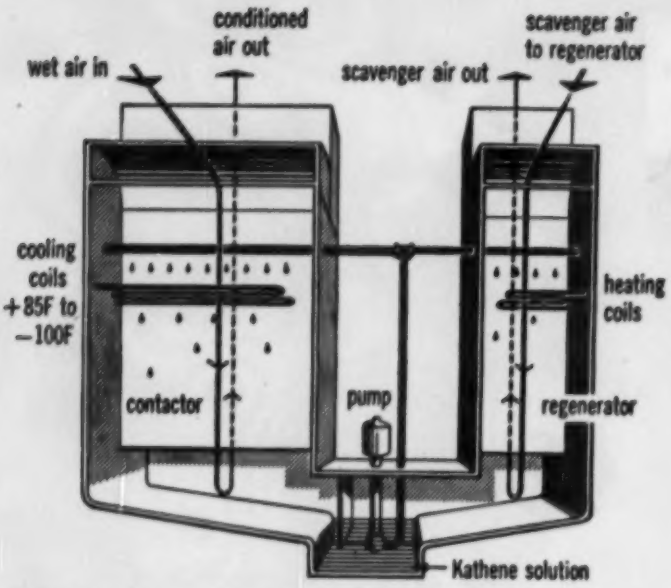


Fig. 2. Line drawing of Kathabar package unit shows primary operational features. The Kathabar system uses low pressure steam for regeneration.

gram of the entire system containing air volumes, temperature and humidities at various points and utility requirements. The diagram is based on maximum summer design conditions with the 5000 cfm of ventilation air being introduced at 100 F dry bulb and 110 grains of moisture per pound.

The 5000 cfm of primary air enters the contactor chamber of the package unit. The package unit used in this system is shown, schematically, in Figure 2. Operation of the unit itself can readily be seen. The incoming air contacts a flood of the absorbent solution, called Kathene, and both pass over finned cooling coils.

The primary constitutent of Kathene solution is lithium chloride. A property of this chemical is that its affinity for moisture can be varied by regulating either its temperature or concentration, or both. For Kathabar operation the concentration is usually maintained constant and the temperature of the absorbent solution is varied by regulating the temperature and rate of flow of coolant in the coils.

Thus the cooling coils in the contactor section perform two functions. They cool the absorbent solutions to the predetermined temperature necessary for proper dehumidification and they cool the air. At maximum only 51 gpm of the 85 F cooling tower water is used. After passing over the coils the cooled and dehumidified air is exhausted into the air supply system at 96.5 F, 50.5 gr/lb. The Kathene solution falls into a sump. From this sump the solution is constantly being pumped back to the flooding nozzles in the contactor section and also those in the regenerator section on the right.

This latter chamber is much smaller than the contactor section and the amount of solution sprayed in it is much less. Regeneration is also automatic. As the absorbent solution becomes diluted it occupies more volume in the sump. This raises a ball float attached to a mercury switch. When the solution level raises the float to a predetermined level the switch closes an electric circuit. A motorized steam valve is actuated, allowing low pressure steam to enter the coils in the regenerator.

The solution passing over these coils is thus heated. As its temperature rises, it cannot retain the moisture absorbed in the contactor chamber. The moisture is vaporized out and is entrained by a scavenger air stream which purges it to the outside. This system uses at maximum only 357 lb/hr of 10 psig steam for regeneration.

In the distribution duct system the cooled and dehumidified air is supplied to the mixing plenums on the second and fourth floor. There it is mixed with the 23,900 cfm of recirculated air at 80 F, 77 gr/lb from each floor. This air mixture, 28,900 cfm at 82.6 F, 72.6 gr/lb is then filtered and cooled to the delivered air conditions of 64.2 F, 73.3 gr/lb. The aftercooling coils in these fan rooms and in the booster coils on the various floors use at maximum 109 gpm of 56 F chilled water. A 50 ton compres-

(*Continued on page 78*)

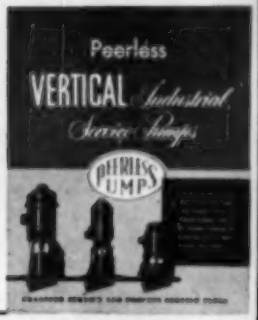
Operating Results . . .

This system has proven to be efficient and economical in operation. The antiseptic action of the liquid absorbent, essentially lithium chloride, has been an important plus benefit. Bacteria counts in the air stream leaving the Kathabar unit are sharply reduced from those entering. Aftercooling is performed with dry coils, since the air moisture reduction is accomplished in the Kathabar units, eliminating a source of odors and bacteria growth found in many systems.

There has not been any carry-over of absorbent solution with this system. Maintenance on the system has been only routine, consisting chiefly of periodic checking of filters, spray heads and control settings.

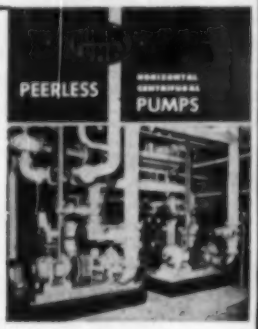
Because of the high latent loads, and the relative cheapness of gas, this system seems to be ideally suited for comfort air conditioning in the southwest.

look AT THE PUMPING PROBLEM *two ways*



VERTICAL

HoRizontal



PEERLESS PUMP DESIGNS PROVIDE THE RIGHT TYPE FOR DOING THE JOB BETTER

You pick the design; Peerless will supply the pump. From one of the broadest range of pump capacities, heads, horsepowers, you can choose a Peerless horizontal or a Peerless vertical pump for almost every liquid transfer job, involving either water or process liquids.

In the picture at the top above, a concentrated solution of sulphuric acid and aluminum sulfate is being pumped by Peerless vertical industrial service pumps. To find out all about them request Peerless Bulletin No. B-505.

The Peerless horizontal type A pump shown just above, is one of three that supplies plant water for a textile mill. To find out all about them request Peerless Bulletin B-1300 and B-1350.

Use the coupon below to find how these Peerless designs can meet all your pumping needs with economy, efficiency and dependability.

PEERLESS PUMPS

fmc

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
Factories: Los Angeles 31, Calif., and Indianapolis 8, Ind.
Offices: New York; Atlanta; Chicago; St. Louis; Indianapolis, Ind.; Phoenix; Fresno; Los Angeles; Plainview and Lubbock, Texas; Albuquerque, New Mexico.
Distributors in Principal Cities. Consult your Telephone Directory.

PEERLESS PUMP DIVISION
Food Machinery and Chemical Corporation
301 West Avenue 26, Los Angeles 31, California

Please send bulletins checked below:

- ☐ PEERLESS INDUSTRIAL SERVICE PUMPS (B-505)
- ☐ PEERLESS TYPE A HORIZONTAL PUMPS (B-1300)
- ☐ AND TYPE AS (B-1350)

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

SP&I

Kentucky Better Production
Case Study

Packaged Steam Generators Serve Waste Wood Chip Processing Plant

By FRANCIS A. WESTBROOK

A NEW plant for the manufacture of Chipcore by a vertical extrusion process, the first of its kind in this country, has recently been placed in operation at Henderson, Kentucky by the Jasper-American Company. The product is used for veneer work and plywood and is made of waste wood chips by means of a vertical extrusion process in a continuous strip 4 ft wide. It is very important from the standpoint of wood conservation.

Process Data

Waste wood from an adjacent lumber mill, much of it with bark adhering to it, is run through a hog, or chipper, at ground level. A pneumatic conveyor delivers the chips to a bin at a higher level from which they are fed by a vibrator to a fine grinder where they are reduced to uniform sized slivers about ½ in. long or less.

From the fine grinder the chips pass by gravity into a horizontal cylindrical dryer for reducing the moisture content to the desired level. After drying, the chips are elevated by pneumatic conveyor to a bin at the top of the building. From this they drop through a vibrator to the mixer where they are combined with the Monsanto bonding material. The mixture passes by gravity to the press hopper and from the latter into the press, or vertical extrusion machine, in both cases through vibrators.

There are two of the latter so that two different thicknesses of core can be produced at the same time. Cores ⅞ in. thick, or more, have longitudinal tubular holes to reduce the weight, and those less than ⅞ in. thick are solid. As the core, made of bonded chips, emerges from the vertical extrusion machine in a continuous ribbon it is a simple matter to cut it off in any desired lengths. The rate of production is 20 fpm.

The Smith Lumber Company, immediately adjacent to the Jasper-American plant, uses its own green sawdust as fuel for its steam plant to generate its own power, and all the scrap is available for the manufacture of the Chipcore. When the latter operation is fully developed, it will use most, if not all, of the scrap produced by the lumber mill. This means that none of the wood will be wasted and that as a conservation measure the arrangement is practically 100% effective.

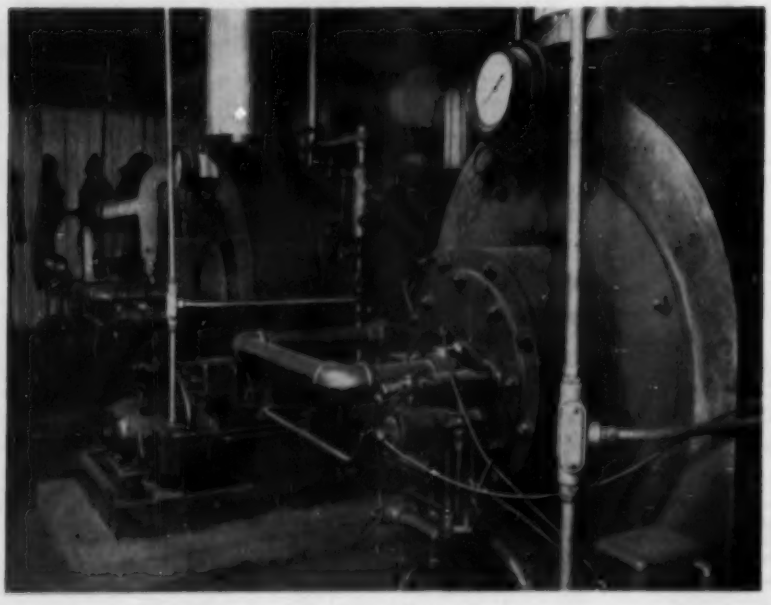
The Chipcore is said to cost some 30% less than conventional core stock, and the vertical extrusion process provides for an even distribution of large and small chips, which assures a high degree of dimensional stability due to the alleviation of stresses and strains normally associated with such products. The surface is highly suitable for the good bonding of veneers and other materials.

Steam Generation

Among the most interesting features of the new Jasper-American plant are the steam generating facilities which have been especially arranged with reference to the requirements of the vertical extrusion process. Two Cyclotherm (C-2100) package steam generating units designed for 200 lb working pressure have been installed. They are normally fired with natural gas but have provision for No. 3 fuel oil standby.

Steam is used to heat the building through pressure reducing valves and with unit heaters. This part of the steam demand is of course seasonal but the continuous and largest use for steam is

(*Continued on page* 78)

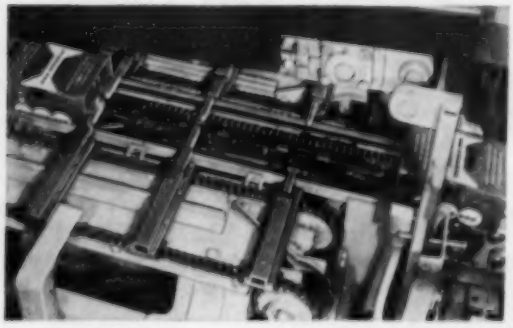


Automatic steam generation is convenient and economical. Cyclotherm units are compact, occupying minimum floor space.

PACKAGING 900 CANS *per minute!*

Another complex timing and conveying problem solved through the use of

DIAMOND ROLLER CHAINS



ALWAYS PRELOADED For many, many years, Diamond Chain has been preloaded after assembly for the purpose of bringing pin-bushing seating into stabilized relationship prior to field installation.

Packaging cans from 3½ ounces to one quart sizes in single or double file and in cartons of from 2 to 12 units is an easy job for this versatile new Cluster-Pak* and its revolutionary cartons requiring no glue or staples.

The design of the machine incorporates Diamond Roller Chains for precision timing, power transfer and conveying. High output, dependable, low cost operation is essential—there can be no substitute for uniform highest quality Diamond Roller Chains.

On your machinery, Diamond Chain can simplify and improve design, permit easier, faster fabrication and assure outstanding performance . . . Diamond Engineers will gladly help you solve drive and conveying problems.

*"Cluster-Pak" is the registered trade mark of the Atlanta Paper Company

DIAMOND CHAIN COMPANY, Inc.

Where High Quality is Traditional

Dept. 612, 402 Kentucky Ave., Indianapolis 7, Indiana

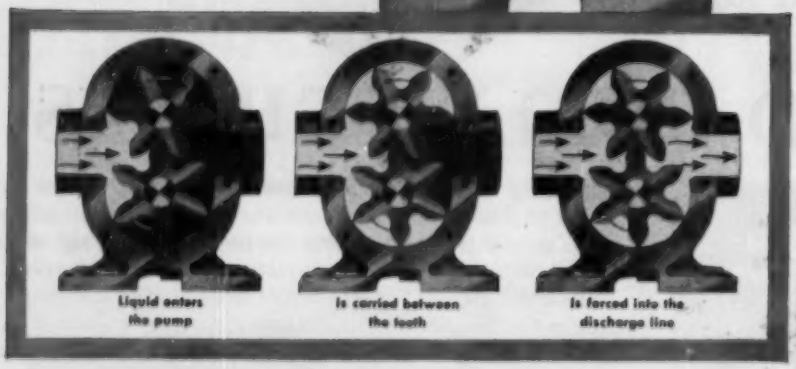
Offices and Distributors in All Principal Cities

Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER

DIAMOND ROLLER CHAINS

IF
"THE PRINCIPLE OF THE THING"
MEANS ANYTHING TO YOU
then look to ROPER

only 2 moving parts
HELP MAKE ROPERS DEPENDABLE



SMOOTH AND QUIET FLOW...
EQUAL EFFICIENCY IN EITHER DIRECTION

HOW IT OPERATES — The unmeshing of the gears produces a vacuum, drawing the liquid into the tooth spaces. The liquid is carried between the teeth and case to the opposite side of the pump. The meshing of the gears forces the liquid into the discharge line. This is a positive displacement pump. The Roper principle is simple in design. It has only two moving parts — equal size pumping gears — operating in a case with proper amount of clearance to promote high efficiency and long life.

GEO. D. ROPER CORPORATION 442 Blackhawk Park Ave., Rockford, Ill.

Send for helpful handbook
"HOW TO SOLVE PUMPING PROBLEMS"

ROPER Rotary Pumps

for curing the cores by high temperature application.

The steam for this process is piped to a hot water converter in which hot water is circulated to the extrusion equipment at a temperature of approximately 350 F. The unique part of this portion of the installation is a direct steam connection piped from the boiler header into the top of the expansion tank for the hot water heating system for the presses. This eliminates an automatic air vent at the high point and takes care of the expansion of the water in the system as it is heated.

The plant operates on a continuous production basis 20 hours per day. The fuel bill amounts to about $350 per month using natural gas at a 3.6 rate. One Cyclotherm unit handles the entire plant load except for a few days in winter when the heating load is at a maximum. In other words, the second steam generating unit acts as a standby most of the time.

The method of steam generation being fully automatic makes it very convenient and economical. The units are very compact, occupy a minimum of floor space and are easy to keep clean and neat in appearance.

Humidity Control

(*Starts page 72*)

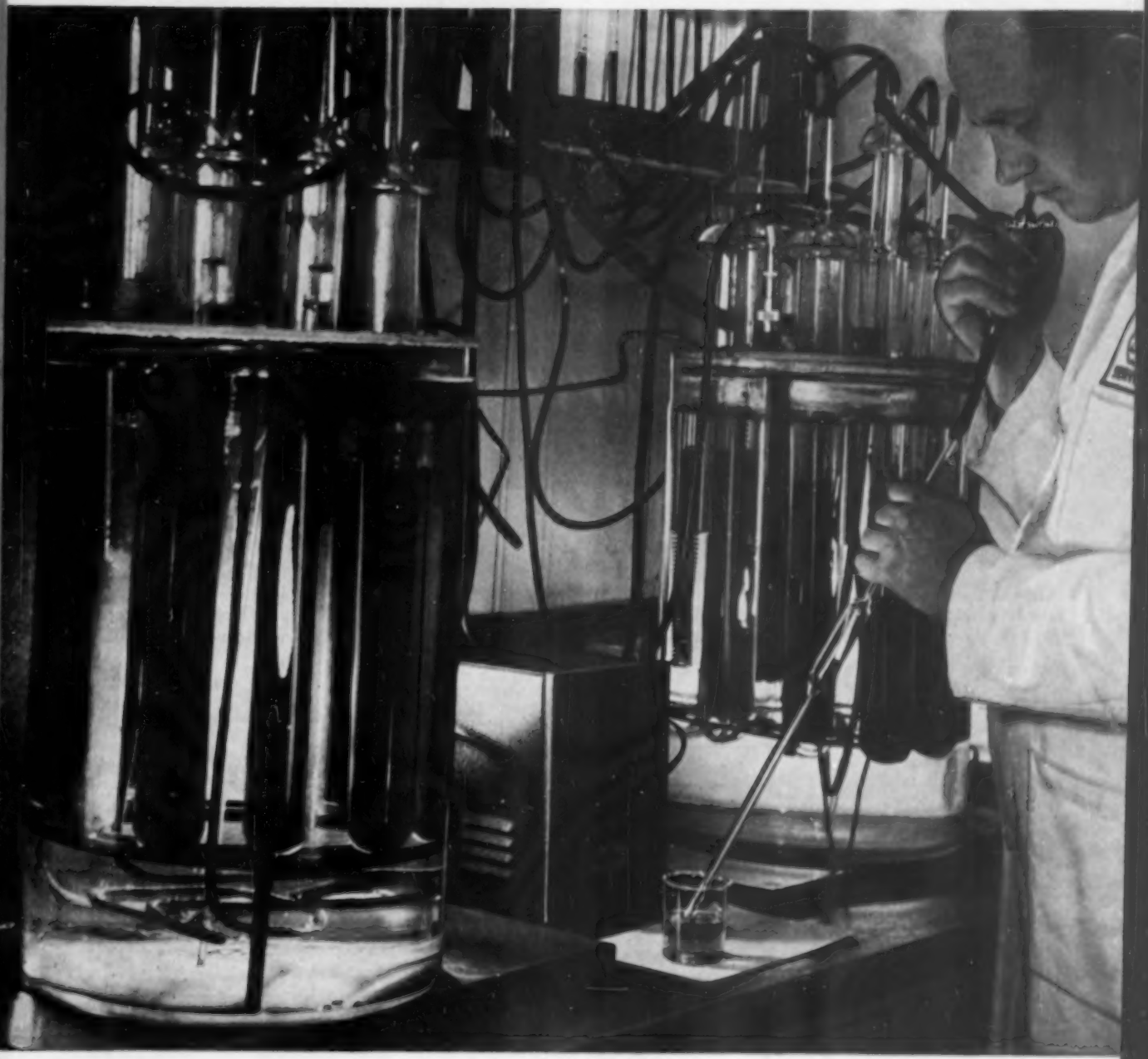
sor system supplies this chilled water to these coils.

Maintained conditions in the space are 80 F dry bulb, 67 F wet bulb, 77 gr/lb (50% RH).

The maximum internal sensible heat load is calculated at 494,780 Btu/hr. Internal latent heat load at maximum is 90,500 Btu/hr. The determination of the amount of ventilation air needed was based on the activity and requirements of approximately 280 people.

The Architects of the building were *Nolen and Moore* of Oklahoma City. *The Chas. M. Dunning Construction Company*, also of that city were the Contractors. *Collins and Gould* were the Mechanical Consultants and *Hirsch-Swan Corporation* were the Air Conditioning Contractors.

GOING PLACES *into a drop of oil with Cities Service...*



Cities Service researchers enter the minute world of the molecule and come out with new and better products . . . for example, 5-D Premium gasolene and 5-D Koolmotor oil. The superior performance of these new products has boosted sales of Cities Service gasolenes at double the rate of industry demand.

CITIES SERVICE

A Growth Company

HELPING the *MAN-IN-THE-PLANT*

Ideas . . Methods . . Gadgets

Control of Multiple Pump Operation

A NUMBER of years ago we installed a unit consisting of a steam turbine driving two 14,000 gpm, 56 ft head, 585 rpm centrifugal pumps in parallel. Recently the herringbone reduction gears between the turbine and the two pumps wore out requiring replacement of the gears at a cost of over $10,000—or some other driving method. The gear replacement delivery would require six months. A down time of that length could not be permitted. Therefore, it was then decided to drive each pump individually with a 250 hp, 585 rpm squirrel cage motor.

The turbine and gears were removed and the motors were installed on the original bedplate.

The pumps, as installed, had a common suction valve and also a common discharge valve. The 24" discharge piping was installed with one pump having an ell directly connected to that pump while the second pump had a 24" pipe, 5 ft long between it and a similar ell. The two ells then connected with a 42" header on the other end of which was the common discharge valve.

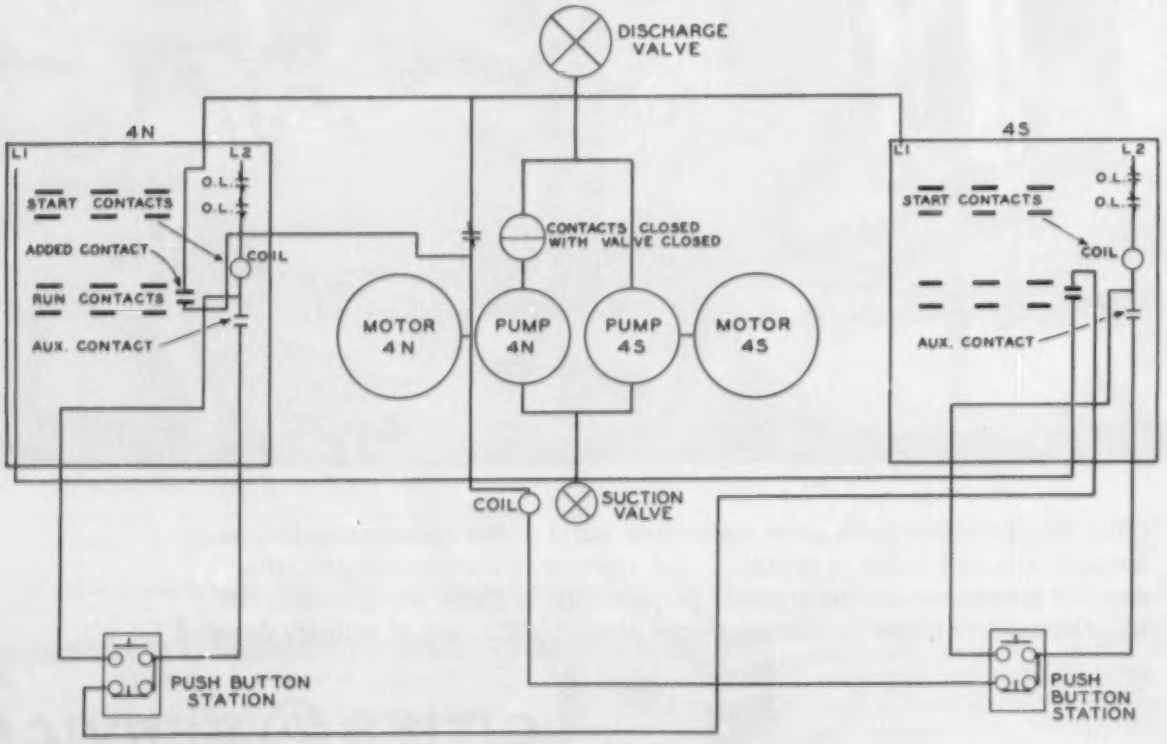
Due to the piping arrangement it was not possible to install individual valves in both pump suction or discharge lines so a hand-operated discharge valve was connected in one pump discharge line by shortening the 5 ft pipe.

Operating Problems

The question arose as to the reversed speed of one pump if its motor control kicked out while the second pump was running. The water delivery under these conditions was also questioned.

The two motors were installed with reduced voltage primary resistor type magnetic controllers.

The pump which did not have the added discharge valve was placed in operation with the new discharge valve closed on the second pump and the motor controller



ANACONDA INTERLOCKED-ARMOR Cable is installed on simple racks and eliminates the need for conduit. Installation work is finished often in half the time required for other cables.

Cut installation time and cost with cable with its own inbuilt flexible conduit!

When you expand or relocate your power feeders, Anaconda Interlocked-Armor Cable puts you into *full* operation days—sometimes weeks—sooner.

Because it is made with its own tough yet flexible armor, Interlocked-Armor Cable is installed without conduit. Installation time and costs are slashed.

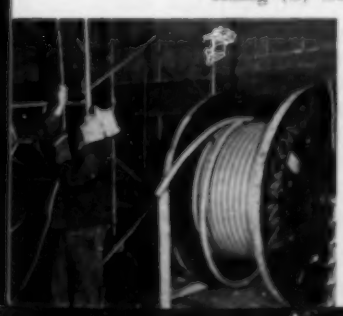
It is laid quickly—indoors or out—on light, easily installed racks. It is trained smoothly around corners, columns and other obstructions in *long, uninterrupted* runs. And this cable's metal tape armor affords high protection against damage.

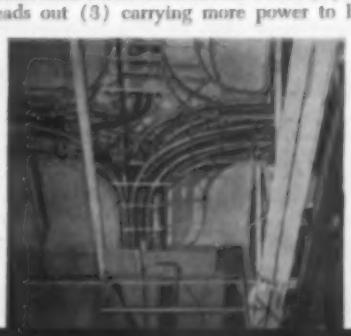
Available in multiconductor construction in sizes No. 6 Awg to 750 Mcm—varnished-cambric insulation up to 15 kv—Underwriters' approval for 600 volts and 5000 volts. Also available with rubber or plastic types of insulations.

Why not talk to the Man from Anaconda about modern, practical Interlocked Armor Cable today? Or, for information, write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

ANACONDA®

METALWORKING PLANT expands its power system with Anaconda Interlocked Armor Cable (1). Cable drops from ceiling (2) from transformer on floor above, and spreads out (3) carrying more power to local centers (4).





HOW TO GET

New Economy

IN

EFFECTIVE VESSEL INSULATION

WITH

Copr-fibre

BLANKET INSULATION

AND

METAL JACKETING

INSULATION SUPPORT RING
VESSEL SHELL
METAL BANDING
Copr-fibre BLANKET LACED TOGETHER AND LACED TO SUPPORT RINGS
INTEGRAL VAPOR BARRIER ON METAL JACKET
SHEET METAL SHEATHING

Insulating vessels and similar equipment with Copr-fibre Blankets and sheet metal jacketing provides an insulation of *greater efficiency* than can ordinarily be expected — and yet at a *lower cost*. This better method (together with complete materials and application specifications) is explained and illustrated in a highly informative brochure just published. If you have not received one, send the coupon today for your free copy of Bulletin 541.

Copr-fibre Blankets with metal jacketing give these advantages:

- Low initial application cost.
- Higher insulating efficiency.
- Effective weather protection.
- Better appearance.
- Longer vessel life.
- Less repair at lower cost.

MAIL COUPON NOW

FORTY-EIGHT INSULATIONS, Inc.
Telephone: AUrora 6-8578
AURORA, ILLINOIS

Yes, send me a copy of 48's Bulletin 541.

NAME_____
TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

of the second pump in the off position.

A graphic flow meter showed the running pump was delivering its rated water capacity. The new discharge valve on the second pump was then opened gradually in steps of one inch on the rising stem of that valve. The second pump started running in reverse with the discharge valve stem raised one inch. A tachometer on that pump shaft showed a reverse speed of 120 rpm. When the valve stem was raised two inches the reversed speed was 315 rpm. Finally, with the valve stem raised 4" the reversed speed was 720 rpm.

It was not deemed advisable to go beyond that speed for fear of damage to the reversed motor or pump. It was evident the reversed speed with the valve wide open would have been possibly 1500 rpm. The graphic flow chart showed the water delivery from the first pump to the system was decreasing as the discharge valve gate of the second pump was raised.

To permit safe operation of these pumps additional contacts were installed on the motor control panels and a limit switch was attached to the new discharge valve so that the limit switch was closed only when the valve was closed. With this arrangement it was possible to operate Pump No. 4S alone or both pumps without danger.

Connections were made as shown in the diagram. The diagram, of course, only shows the parts that are pertinent to this discussion.

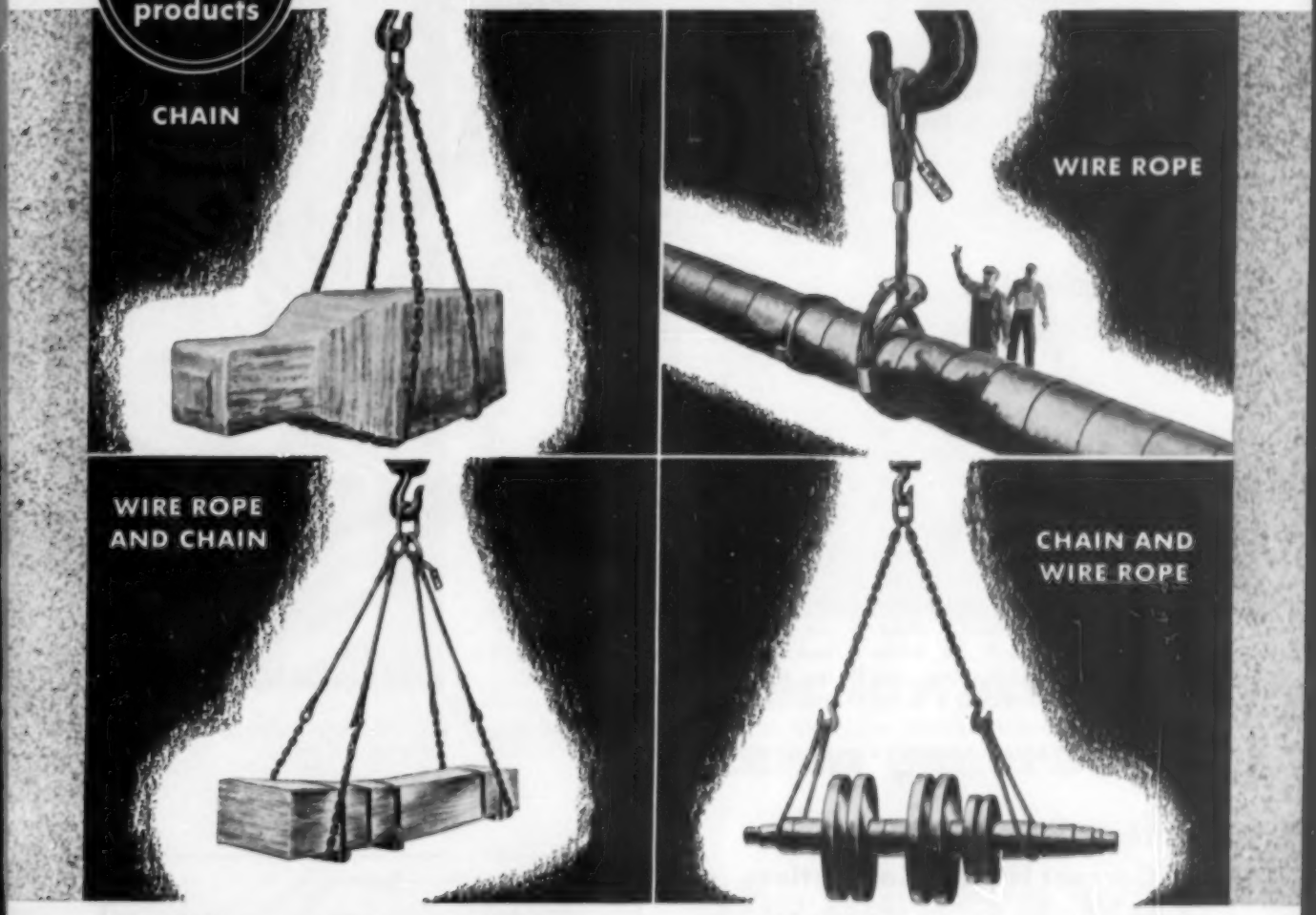
The connections could have been made without the added contacts by connections to the motor running contacts but it was deemed safer to isolate each control circuit as far as possible.

A hydraulically-operated control was installed on the common suction valve so that valve closed when the motor control circuits opened. This was done because a third pump is installed which has its own suction in the same source

ACCO products

ACCO Registered* Slings–Wire Rope & Chain

THE STANDARD OF EFFICIENCY AND SAFETY



Different Loads Require Different Slings

–AND ACCO Registered* HAS THEM ALL!

• The shape or weight of a load, its temperature, protruding sharp corners—all these and other factors should influence the choice of a sling for any particular job. On some jobs chain slings are best. In others the characteristics of wire rope make it the first choice. And in still other cases a combination of wire rope slings and chain slings will provide the greatest lifting efficiency.

The safest slings available

Each component of an ACCO *Registered** Sling is made from the best materials procurable for its use. Each part is first individually tested—it must prove to have strength equal to or greater than the sling body. All hooks for ACCO *Registered** Slings are also Magnaflux tested. Then these components are assembled into slings according to carefully engineered designs that have proved themselves in rigorous field tests.

The completed sling is then individually proof-tested to twice the working load limit. Then and only then, is it awarded the coveted ACCO Registration certificate and the ring or the tag as the case may be.

Compare this quality control, precise manufacturing, and proof testing with the necessarily hit-or-miss methods used in producing "home made" or hand assembled slings. You'll see why ACCO *Registered** Slings are safer.

And ACCO *Registered** Slings cost less in the long run. Their precision design and manufacture insure longer life—cut your overall lifting costs. Your ACCO Representative has the facts. If you don't know who he is, please write our office at Bridgeport, Conn.

*Trade Mark Registered

Write our Bridgeport Office for helpful literature

ACCO

TRADE MARK

AMERICAN CHAIN & CABLE

BRIDGEPORT, CONN.

Atlanta, Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Wilkes-Barre, Pa., York, Pa.
In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.

for Better Value

and discharges in the same basin. Thus the third pump could cause reversal of the two pumps discussed if all valves were open.

By VICTOR N. FRIEDMAN, Me.

Regenerative Fly Ash Collector

THE Bell Laundry and Dry Cleaners, Greenville, South Carolina, reduced expenses by turning to wood as fuel. Woodworking and furniture plants in the area produce large quantities of waste wood in the form of shavings, sawdust, chips, etc. Since this waste presents a disposal problem to them, they are glad to have people who can use the material haul it away.

Bell Laundry rebuilt its boiler furnace to permit burning this refuse wood and installed a large bunker and conveyor system to store the wood which is trucked in from nearby plants. This waste wood is then blown into the furnace and burned.

Since the individual chips of wood are very light and lose weight while burning, they tend to be carried along by the rapidly moving gas stream in the furnace. Many of these pieces are not completely burned and are carried out of the boiler as fine charcoal. While this "fly ash" is a small portion of the total fuel, there is enough of it to cause a severe nuisance and make it difficult to keep the laundry clean. In order to continue the use of refuse wood as the fuel without producing a fly ash nuisance, the company decided to install a Regenerative Fly Ash Collector, manufactured by Breslove Separator Company. This has completely corrected the difficulty.

B. Jack Foster, president of the dry cleaning company, reports that the atmosphere around the plant is now clean and the dust problem in the finishing department has been eliminated. This has been a great help in their production and they are also very pleased with the saving in labor formerly needed to clean up the plant.

Correct Heater Connections

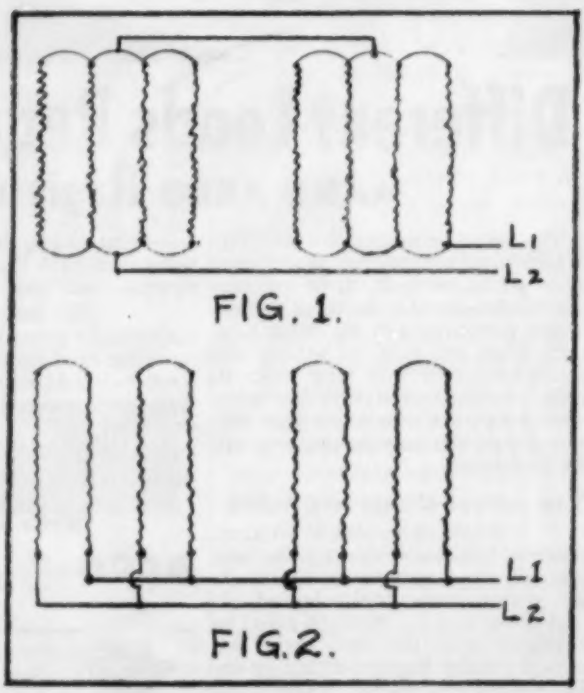
WHEN connecting up groups or banks of heating elements for series parallel operations, the group should never be interconnected in parallel and then in series with another group. Always connect pairs of heaters in series and then in parallel.

Should one group fail when a group is connected in parallel and in series with another group, unbalance of load will cause the high resistance bank to assume the overload. The damaged heater section then fails progressively until the circuit is completely open and all heating is lost.

The purpose is to achieve load balance across the power line supply. The first hook-up accomplishes this function as long as all elements remain in circuit. But, the failure of a single element will upset the balance to overpower the others.

The correct (Fig. 2) circuit also balances the load across the supply line. But, in the event of an element failure all the remainder of the group continue to operate at normal voltage and current. The heating capacity is affected only to the degree of element outage.

By PAUL ZIEMKE, Oak Ridge, Tenn.



For lowest cost steam generation, GE burns coal the modern way

General Electric's Major Appliance Division in Louisville, Ky., has five product manufacturing buildings, a warehouse and service buildings—over 4 million sq. ft. under roof. To generate all steam necessary for process work and heating requirements of this vast area, GE's power plant burns coal the modern way. Coal was chosen for two reasons. One, a careful fuel cost study disclosed that, on a straight economic basis, coal would give GE the lowest cost steam generation of all fuels. Second, availability of supply was considered and again coal won over other fuels. In addition, full mechanization of GE's power plant has facilitated all details of coal handling and ash removal while completely eliminating any possibility of air pollution.

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

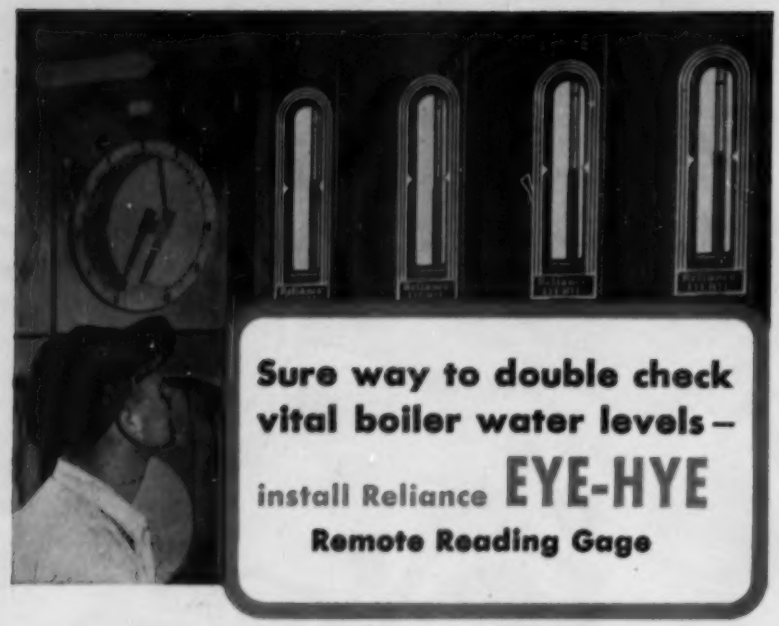
NATIONAL COAL ASSOCIATION
Southern Building, Washington 5, D. C.

Consult an engineering firm

Designing and building hundreds of heating and power installations a year, qualified engineering firms can bring you the latest knowledge of fuel costs and equipment. If you are planning the construction of new heating or power facilities—or the remodeling of an existing installation—one of these concerns will work closely with your own engineering department to effect substantial savings not only in efficiency but in fuel economy over the years.

facts you should know about coal

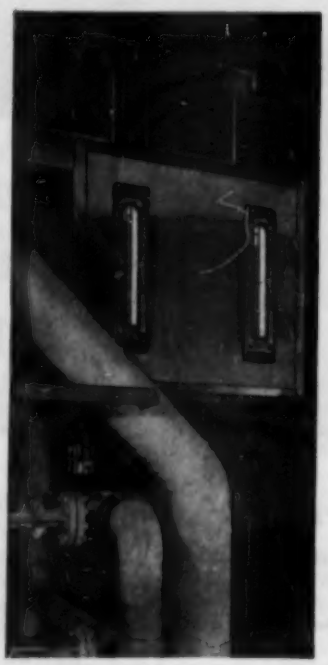
In most industrial areas, bituminous coal is the lowest-cost fuel available. • Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar. • Automatic coal and ash handling systems can cut your labor cost to a minimum. Coal is the safest fuel to store and use. • No smoke or dust problems when coal is burned with modern equipment. • Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.



It's fine to have automatic controls, but be sure you have the important safeguards against possible failure — adequate *maintenance* and *cross-checks.*

EYE-HYE is your reliable cross-check for *boiler water levels.* A manometric-type remote reading gage, it keeps operators informed on water level status. Easier to read than conventional gages, although it's the same familiar form — a vertical column of liquid. EYE-HYE's indicating fluid is a pleasing green that "pops out", brightly illuminated from the rear.

You can place EYE-HYE any reasonable distance from the drum — above or below it, on wall or instrument panel. Easy to install and maintain — no mechanical working parts — no adjustments on location. Write for Bulletin CO and learn how EYE-HYE can increase the efficiency of *all* your water levels.



How one user checks water levels in surge tank and feed water heater with long type EYE-HYEs. (Face plate can be calibrated at factory.)

The Reliance Gauge Column Company
5902 Carnegie Avenue • Cleveland 3, Ohio

Shop Housekeeping As a Production Tool

THE words "more production or better production" to the average engineer or technician automatically spark the thinking toward automation. This is a rather natural trend for technician or engineers in as much as they have been schooled and trained in this field. Automation, even with all of its accomplishments in our present day industrial world, will never, in the opinion of the writer, replace the requirements for men in industry.

Let us lay aside our cloak of technicalities and engineering details for a short moment and explore one of the possibilities that can be used as effectively as a production tool. Common or lowly shop housekeeping is a very effective and efficient production tool. It has, as a matter of fact, however, been proven, here in this southwestern manufacturing organization, that shop housekeeping is a very necessary part of production and efficient operation.

Invites Safety

A simple and unbiased investigation into the problem reveals that a shop housekeeping program almost inevitably invites a safety program, much the same as the safety program inevitably invites a good shop housekeeping program. Then one can assume that a discussion of shop housekeeping as a production tool, is a discussion on the preservation of the most essential tool that we have for production: Man. A good shop housekeeping program will very definitely affect the outlook and attitude of the people working in our respective manufacturing organizations.

It can readily be seen that from a tangible point of view a good shop housekeeping program will increase the efficiency of such production operations as transportation, maintenance, industrial relations, quantity and quality control,

For liquid-handling economy

select the right pump for the job

Goulds pumps are designed for easy maintenance and built so they need a minimum of it.

These seven groups of pumps are only a few of the many models made by Goulds—yet in these groups are pumps for hundreds of industrial liquid-handling jobs—242 combinations of pump models, sizes and materials.

Standardization of parts for interchangeability among different groups of pumps helps keep your parts inventory low. And most models are available in a variety of materials to suit varying liquid-handling requirements.

Many other unique features mean fewer maintenance worries for you, longer service life. Support heads have a cooling chamber preventing transfer of heat to bearings. Shaft sleeves are shouldered on the shaft near the impeller. They expand and contract freely with temperature changes. Sealed housings keep dirt and moisture out of the ball bearings.

Specify Goulds pumps and take advantage of their cost-saving features. Your Goulds representative will help you select the pumps best suited to your needs. Consult him on your liquid-handling problems, or write direct to Goulds Pumps, Inc., Seneca Falls, N. Y.

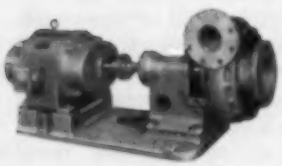
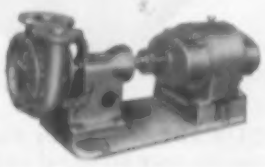


Fig. 3755 single-stage, enclosed impeller pump, available in 21 sizes providing capacities up to 3,800 GPM, heads to 400 ft. Extra-heavy construction throughout, for trouble-free service 24 hours a day, over long periods. Send for Bulletin 715.1 for specifications, performance curves.

Fig. 3718 single-stage, chemical pump for handling corrosive and abrasive liquids. 9 sizes provide capacities up to 720 GPM, heads to 200 ft. Available in Types 316 and Gould-A-Loy stainless steel, all-bronze, all-iron, bronze-fitted, or iron or bronze with stainless trim. Ask for Bulletin 725.4.



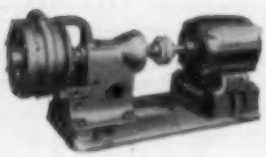


Fig. 3348 two-stage pumps in 5 sizes provide heads up to 500 ft., and capacities to 120 GPM. Impellers mounted back-to-back neutralize end thrust. Impeller clearance easily adjusted by external means. Write for Bulletin 718.2.

Fig. 3320 "close-coupled" two-stage pump, in 5 sizes, provides heads to 500 ft., capacities to 120 GPM. Impellers mounted back-to-back, directly on extended motor shaft. Permanent alignment assured by recessed lock fit on adapter. Ask for Bulletin 713.1.

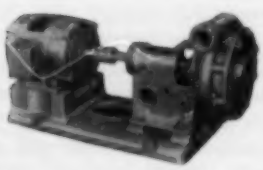


Fig. 3770 single-stage, enclosed impeller pump, with belt or motor drive. 14 sizes with capacities ranging from 10 to 1,800 GPM, and heads to 120 ft. Ideal for clear liquid applications. Available in all-iron, all-bronze or bronze-fitted construction. Write for Bulletin 622-A2.

Fig. 3189 single-stage, open impeller pumps, with belt or motor drive. 10 sizes provide capacities up to 1,000 GPM, heads to 180 ft. Especially built for handling slurries, other solids—containing liquids. For specifications, performance curves, write for Bulletin 720.4.

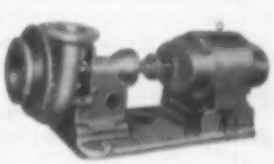


Fig. 3650 single-stage "close-coupled" pump, for motor or turbine drive. 20 sizes offer capacities to 2,000 GPM, heads to 400 ft. All units are self-contained, need no special foundation. Open-top construction gives ready access to gland and stuffing box. Available in all-iron, all-bronze, or bronze-fitted construction. Send for Bulletin 710.1 to get specifications, performance curves, other details.

Goulds PUMPS INC.
Seneca Falls
New York

Atlanta • Boston • Chicago • Houston • New York • Philadelphia • Pittsburgh • Tulsa

YES,

there is an ALL-PURPOSE gasket material

DURABLA Asbestos Sheet Packing, continuously produced and marketed for almost 50 years, can be used with a proved knowledge of safety wherever Gaskets are required.

Constructed of a thoroughly digested mixture of the highest grade carded Canadian Asbestos fibre, with special compound, this gasketing is used for the sealing of water, steam, all oils, gases, alkalies, acids, refrigerants and hydrocarbons. Every square inch of sheet has a uniform density, thickness and asbestos distribution.

DURABLA Gaskets do not leak or show distress at 1650 psi, steam pressure at 850° F. Gaskets are supplied in all sizes and shapes accurately machine cut.

DURABLA Sheet Packing is available in commercial thicknesses, such as 1/64", 1/32", 1/16" and 1/8". Also available, on application, are other gauges, including 1/100".

Call your Distributor or write us for descriptive bulletin SPI 125.

DURABLA MANUFACTURING COMPANY
114 Liberty Street, New York 6, N. Y.

® DURABLA

DM-3

stock chasing and production records as well as many other phases too numerous to mention.

What Can be Done

Many factors of a good housekeeping program are universal among industrial establishments; for instance, one step is well kept and defined aisles throughout the plant. A good housekeeping program is basically established around well kept and defined aisles and alley ways. Adequate rubbish and garbage disposal throughout a manufacturing plant constitutes a step toward a good program.

In the case of receptacles for trash and rubbish, it has been psychologically proven that if a spot on the floor is painted the same diameter or to the same outline of the rubbish receptacle, people will unconsciously strive to keep this receptacle located on this spot on the floor.

Overhanging objects throughout a manufacturing establishment should be well defined through the medium of paint, signs or other convenient methods. A simple experiment with this idea in your own plant will prove both amusing and educational.

What It Will Do

Transportation efficiency will increase if the plant facilities have well kept and defined alley ways in aisles with definite boundaries of transportation activities. Most manufacturing concerns have skids or tote trays or some other type of containers as a standard part of their transportation system. Close control exercised over the handling and placement of these containers will be very advantageous to the transportation department.

A good shop housekeeping program will be a great help to maintenance programs. A machine tool that is kept clean and tidy will be around long after the dirty and unkept machine has been discarded because of abnormal wear on exposed guideway surfaces. Grease

MARLEY IS TESTING COOLING TOWERS

AND HERE IS THE RECORD

TEST NO.	TYPE OF SERVICE AND LOCATION	SPECIFIED CONDITIONS				TEST RESULT	
		Gallons Per Minute	Hot Water Temp.	Cold Water Temp.	Wet Bulb Temp.	[1]Degrees Cold Water Temp.	[1]Percent Capacity
1	Air Conditioning—West Coast	400	90°	80°	70°	+0.80°	+9.4%
2	Air Conditioning—Gulf Coast	6,500	101.3°	88.5°	80°	—0.40°	—4.3%
3	Chemical Plant—East Coast	18,500	104°	89°	76°	+0.50°	+3.8%
4	Chemical Plant—East Coast (1 of 4 duplicate units)	27,500	103°	88°	76°	—0.40°	—3.2%
5	Power Plant—Southwest	57,500	109.6°	92.6°	78°	—0.04°	—0.4%
6	Petroleum Refinery—Gulf Coast	3,400	115°	80°	70°	+0.90°	+8.5%
7	Power Plant—South Central	83,000	108.1°	90°	76°	—0.04°	—0.4%
8	Power Plant—Mountain States	45,000	105°	83.7°	63°	+0.20°	+0.8%
9	Petroleum Refinery—Gulf Coast	15,000	111°	90°	82.5°	+0.70°	+7.7%
10	Petroleum Refinery—Gulf Coast	36,570	120°	90°	82°	—0.60°	—4.4%
11	Power Plant—Southwest	70,450	102.6°	86°	70°	—0.86°	—4.4%
12	Power Plant—Southwest	70,450	102.6°	86°	70°	—0.51°	—2.7%
13[2]	Power Plant—East Central	13,000	101°	85°	75°	—3.70°	—24.3%
14	Power Plant—Mid-Central	44,000	100°	86°	74°	+0.45°	+4.0%
15	Power Plant—South Central	83,000	108.1°	90°	76°	—0.80°	—4.3%
16	Chemical Plant—South	40,000	103.3°	85°	78°	—0.30	—3.0%
17	Power Plant—North Central	37,000	100.5°	83°	72°	+1.20°	+9.6%
18	Petroleum Refinery—East Coast	15,570	115°	85°	76°	+1.10°	+9.0%
19	Power Plant—Mountain States	65,000	101.7°	82°	63°	+0.78°	+4.1%
20	Chemical Plant—Gulf Coast	40,750	123°	90°	80°	—0.16°	—1.2%
21	Chemical Plant—Gulf Coast	11,000	116°	90°	80°	+1.80°	+13.2%
22[3]	Retest of Tower Reported in No. 14	44,000	100°	86°	74°	+0.45°	+4.0%
23[4]	Retest of Tower Reported in No. 11	70,450	102.6°	86°	70°	+0.20°	+1.1%
24[4]	Retest of Tower Reported in No. 12	70,450	102.6°	86°	70°	+0.33°	+1.8%
25	Petroleum Refinery—East Central	6,000	125°	90°	75°	—0.46°	—2.6%
26[5]	Petroleum Refinery—Gulf Coast	10,000	120°	85°	79°	+0.30°	+3.2%
27	Power Plant—Southwest	72,000	112°	92°	78°	+1.05°	+6.6%
28	AEC—East Central (1 of 2 duplicate units)	62,798	132.3°	90°	80°	+0.31°	+3.5%

NOTES: 1) Plus indicates capacity exceeding specified performance; minus denotes deficiency. 2) Tested to determine loss of performance due to extensive settling of basin and resultant misalignment of structure. 3) Retested at higher wet bulb. 4) Retested at contract (higher) horsepower. 5) Tested in accordance with Cooling Tower Institute test procedure (ATP-105 adopted May 1, 1955) and observed by CTI representative.

HERE IS THE RECORD — a consecutive list of ALL acceptance tests conducted by Marley during the 1954-1955 test seasons. All are full-scale tests conducted in strict accordance with specified methods.

Towers tested were of many sizes and capacities, operating under widely varying conditions. Geographically, these tests spanned the entire country and included towers sold since 1950, located at elevations up to 5,000 feet.

HERE IS THE RECORD that offers **more positive assurance of performance satisfaction than any guarantee ever written.** It shows why Marley has the complete confidence to insist that you TEST YOUR TOWER.

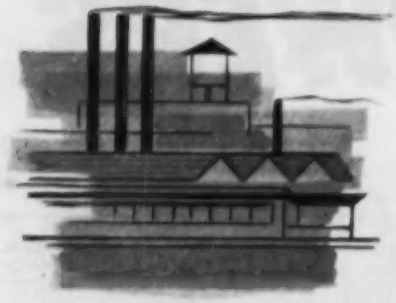
MARLEY

The Marley Company

Founder-Member Cooling Tower Institute

Kansas City, Missouri

When Production Depends on METAL PROTECTION



— as in chemical or food processing where corrosive attack can cause both equipment breakdown and material contamination.

— in the textile industry where air-conditioning equipment performance is a major production concern.

— wherever manufacturing processes demand the ultimate in protection for new metal or old, in exposures ranging from atmospheric to immersion, at temperatures low to high —

Industry Depends on DAMPNEY PROTECTIVE SURFACING

Keeping industrial equipment functioning at new-metal peak efficiency is a task first assigned to Dampney almost fifty years ago. The original Dampney coating, Apexior Number 1, has served continuously ever since in boilers and associated steam generating equipment — nucleus of a corrosion control program that today encompasses equipment in every power and processing category. Dampney coatings and coating systems utilize vinyls, epoxys, neoprene, silicones, ceramics, chlorinated rubber — the best of the newest synthetics — to deliver, in specified end-use service, the finest protection knowledge and experience can offer.

As near as your nearest Dampney representative — corrosion-control know-how that is yours to call upon freely. For a prompt, intelligent appraisal of your requirements, consult in

ATLANTA
Spotswood Parker and Co.

BALTIMORE
Baltimore Copper Paint Co.

CHARLESTON, WEST VIRGINIA
Allied Services, Inc.

CHARLOTTE
E. L. Mountcastle

CORPUS CHRISTI
The J. K. Kalb Co.

DALLAS AND HOUSTON
Marshall, Neil & Pauley, Inc.

NEW ORLEANS
Woodward, Wight & Company, Ltd.

NORFOLK AND RICHMOND
Paxton Company

PENSACOLA AND WINTER HAVEN
George L. Simonds Co.

ROANOKE
R. E. Mundy Company

SHREVEPORT
Hines F. Vaughan

MAINTENANCE FOR METAL

THE DAMPNEY COMPANY

HYDE PARK, BOSTON 36, MASSACHUSETTS

and oil seals that are bad will be exposed quickly in a well kept shop.

Industrial relations will arrive at a much higher level when the workers are convinced that their work place is a matter of deep concern to the supervisor and management of their company. Ideas will flow freely from worker to management and company policies of other nature will become a concern of the worker when he or she is made to realize that the housekeeping program and related safety program is for his or her well-being.

The quality level of a product will definitely rise as a result of a well planned housekeeping program. The workers will develop unprecedented pride in the product that they are manufacturing. It is generally accepted that the environment of an individual has a marked effect on the product that he or she might be handling.

The problems of stock chasing and shop production records are minimized in the well kept production facility. It is possible in this category that a saving in manpower may be effected.

Shop housekeeping is not a subject that is readily made self sufficient through the medium of systems and spelled out company policies. Good shop housekeeping demands a close personal touch from supervision as well as from the operators and workers throughout the manufacturing organization.

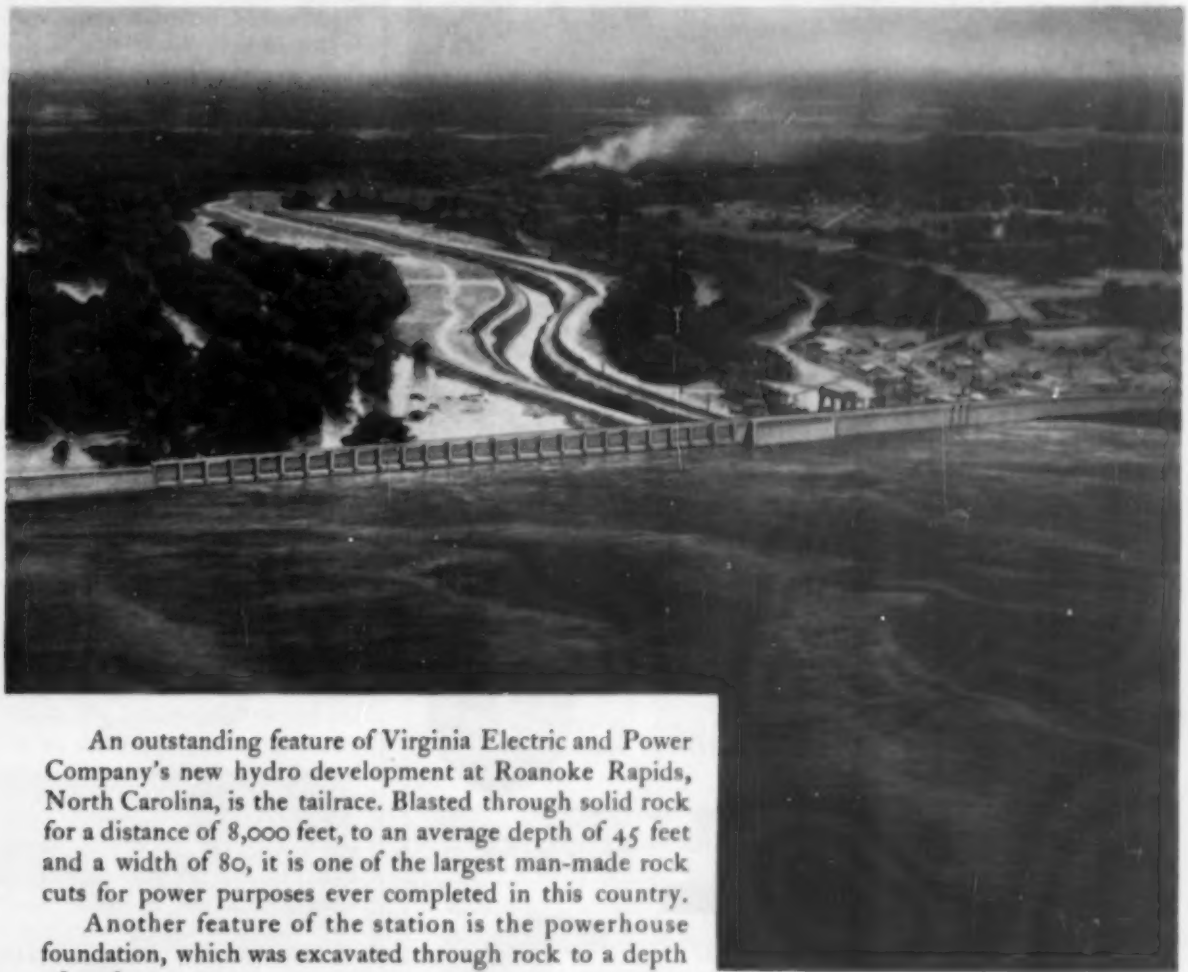
A good shop housekeeping program is going to cost some money. The wide awake management man, however, in a short period of time, will realize a very satisfactory boost in production if shop housekeeping is listed in his or her vocabulary as a production tool.

By C. V. HOGAN, Tool Engineer, R. G. LeTourneau, Inc., Vicksburg, Miss.

KEEP UP-TO-DATE

See Pages 16-19

MAN-MADE ROCK CHANNEL FOR MORE KILOWATTS



An outstanding feature of Virginia Electric and Power Company's new hydro development at Roanoke Rapids, North Carolina, is the tailrace. Blasted through solid rock for a distance of 8,000 feet, to an average depth of 45 feet and a width of 80, it is one of the largest man-made rock cuts for power purposes ever completed in this country.

Another feature of the station is the powerhouse foundation, which was excavated through rock to a depth of 72 feet.

The concrete dam is 3,050 feet long, and provides a maximum net head of 81 feet.

Four adjustable blade propeller type turbines in the semi-outdoor powerhouse add 100,000 kilowatts to the VEPCO system.

View from above dam at Roanoke Rapids Power Station. The project, which will serve the fast-growing Virginia-North Carolina industrial area, requires a reservoir nearly 9 miles long, with a surface of 4,900 acres. Construction was by Stone & Webster Engineering Corporation.

•

Write or call us for information as to how our experience may be of assistance to you.

STONE & WEBSTER ENGINEERING CORPORATION

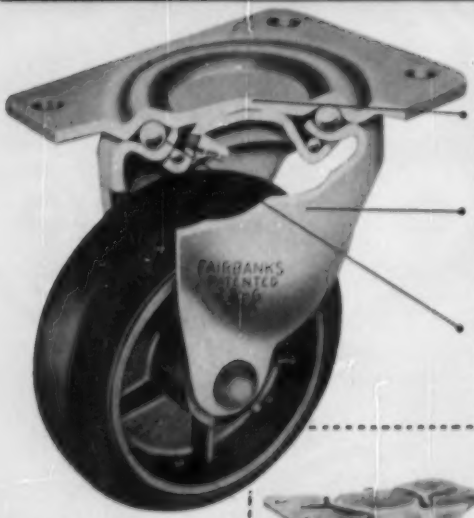
A SUBSIDIARY *of* STONE & WEBSTER, INC.

New York Boston Chicago San Francisco Los Angeles Houston Pittsburgh Seattle Toronto

ACHIEVEMENT IN CASTER DESIGN

FAIRBANKS

"LOCKWELD" Swivel Casters — Without King-Pin!



CHECK these unmatched advantages:

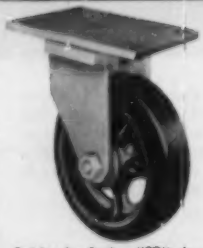
- No King-Pin. Patented "LOCKWELD" construction eliminates the major cause of caster failures.
- Patented leg design—spherical shape provides greater strength through better dispersion of shocks and overloads, easier swiveling under load.
- Larger raceways and ball bearings — perfectly aligned by the rigid welded structure — give faster, easier swiveling action.

Fairbanks Series "23" double ball race swivel casters, for medium duty, sizes 3" to 8".

Fairbanks Series "33" rigid casters, match Series "23" casters in height, sizes 3" to 8".

Fairbanks Series "21" single ball race swivel casters, for regular duty, sizes 2" to 6". Matching rigid Series "31" casters available.

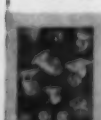
HEAVY DUTY STEEL CASTERS



Fairbanks Series "27" double race swivel casters, for heavy duty, sizes 6", 8" and 10".

Fairbanks Series "37" rigid casters match the Series "27" casters in height, sizes 6", 8" and 10"

Fairbanks Series "500" Vulcanized Rubber Tired Wheels, roller bearing, sizes 3" to 18". Standard of the industry



YOURS ON REQUEST: Casters and wheels catalog complete with specifications and details. Write for your free copy today.

Order Fairbanks products through your local distributor who is always ready to serve you

THE **Fairbanks** COMPANY

393 Lafayette Street, New York 3, New York

Branches: New York 3 • Boston 10 • Pittsburgh 22 • Rome, Ga.

Valves • Truck • Casters • Wheels • Darr & PIC Unions

Dust Saving Pays for Unit in 12 Months

A DUST collector manufactured by Dustex Corporation has been installed in the Floridin Company plant at Quincy, Florida, for over a year and is performing in very close accord with field tests made by Dustex prior to selection of the unit.

This 50-tube, Model M, collector is installed to operate secondary to centrifugal collectors that were already installed and collecting about 90% of the total Fullers earth dust produced.

The Dustex, now installed as secondary, is collecting about 85% of the 10% formerly lost. Not only has the atmospheric dust problem been greatly reduced, but the value of the reclaimed dust will retire the entire unit investment in slightly under 12 months.

Diet Change Beneficial

FOR a number of years, one of the largest manufacturers of fruit and vegetable packing and canning machinery and allied chemicals in Florida have been getting their water supply from an artesian well which carried an unusual amount of scale forming material. Their boiler suffered from an abnormal scale condition which defied many forms of treatment tried.

Eventually, reports of this struggle reached H. K. Wilson of St. Petersburg, Fla. As state representative for the American Sand-Banum Co., he arranged for a test of Sand-Banum Anti-Boiler Scale Treatment. After a two months' run, the boiler was opened with a surprising loss of scale formation which was considered excellent by those familiar with the operation of this boiler and the many treatments previously used.

Fire Hazard Eliminated

THE hazard of loom room fires has been eliminated by a Maryland textile mill since November, 1953 thru the use of self-lubricating metallic solids on loom cams.

With the use of petroleum lubricants lint was continually adhering to the loom cam grease. This was a fire hazard as well as increasing the friction on the cams because the lint sucked the petroleum oil from the grease.

Currently using only a small quantity of Molub-Alloy cam lubricant medium, this Maryland textile mill has extended the lubrication cycle from warp-out to warp-out instead of once-a-week as formerly with oil lubricants. The dry, slick and smoother cams as afforded by the self-lubricating metallic solids in Molub-Alloy cam lubricant presents a surface which will not pick up lint or other loom-room dust.

Impact Wrench Holder

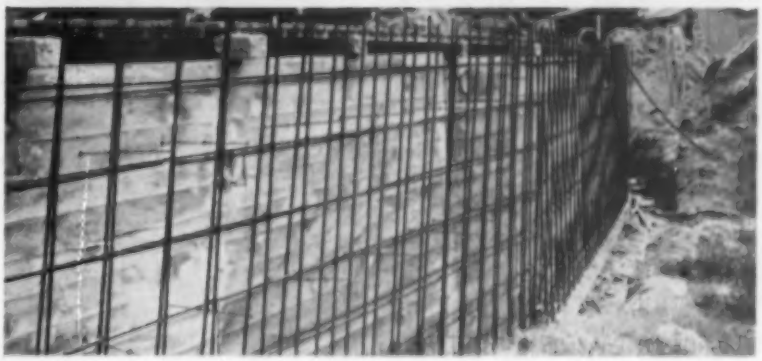
TWO men had to hold an impact wrench on their shoulders and exert an upward force in removing large bolts. The impact wrench was of sufficient weight to make this a very tiring job and hazardous from a safety standpoint.

An impact wrench holder was constructed and has been a great help in handling this job. However, as designed, its use is limited to the situations where the impact wrench is used in a vertical position on the bottom of a vessel or similar object.

The picture shows how it works. The holder is mounted on a small roller platform and the impact wrench is set on top of the holder —directly under the job. Pressure on the foot pedal raises the wrench into working position.

By D. B. TOBIN and D. B. PRICE, Phillips Petroleum Co., Bartlesville, Okla.

FABRICATION THAT BUILDS SATISFACTION



DIXISTEEL
TRADE MARK

FABRICATED CONCRETE REINFORCING BARS

More and more Dixie contractors and builders are turning to Atlantic Steel's Fabricating Division for mill-fabricated reinforcing bars, welded wire mesh and accessories. And here's why: quick, accurate estimates... competent engineering aid—detailing and bills of material... rapid, dependable service... top quality steel and precision bending. Call us in on the next job—little as it might be, big as you hope it will be.

DIXISTEEL FABRICATED REINFORCING BARS, WELDED WIRE MESH AND ACCESSORIES BEING USED ON THESE TYPICAL JOBS

- Industrial buildings
- Bridges—highway and railway
- Driveways
- Commercial structures
- Government buildings
- Schools
- Swimming pools
- Recreational centers

FABRICATING DIVISION
Atlantic Steel Company
ATLANTA, GEORGIA • EMERSON 3441

Equipment . . Supplies . . Methods

FOR FREE INFORMATION—Circle code number on pages 16 & 17

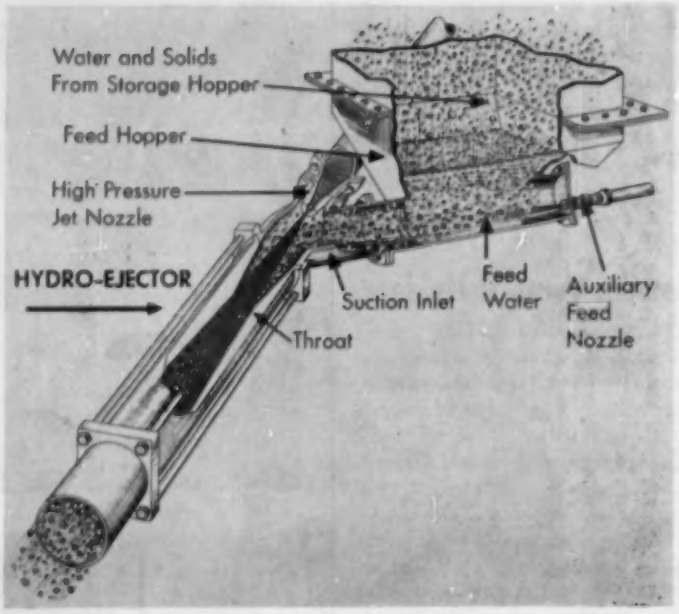
Hydro-Ejector Jet Pumps

Z-1 THE ALLEN-SHERMAN-HOFF Co., 259 E. Lancaster Ave., Wynnewood, Pa. announces its new line of Hydro-Ejector jet pumps, designed to transport solids through pipelines.

The Hydro-Ejector is available in four sizes, for 4, 6, 8 and 10 in. transport pipelines. It offers advantages of simplicity of design, trouble-free operation, ease of installation and low maintenance.

Because the jet nozzle tip is located out of the path of the materials being handled, it cannot interfere with the free flow of solids. The unit is installed with a water-tight housing with access door, observation window and emergency flow connection which encloses the feed hopper and the discharge opening of the storage hopper. This design feature prevents flooding of the operating floor during overfeeding or when draining flooded type storage hoppers.

Iron pyrites can be transported in the same system which conveys bottom ash or furnace slag. This combined operation not only saves time and water, but uses the greater specific gravity of a water-and-ash mixture to carry the heavy pyrites at a higher rate.



Wear on the unit is minimized by use of wear resistant materials, few connecting joints, and locating the nozzle tip out of the path of the material. The Hydro-Ejector can be equipped with special gaskets to withstand the effects of acids, alkalis and high temperatures.

Installing the Hydro-Ejector as a unit is a simple operation. It is factory assembled and has only three points of attachment. The unit is easy to disassemble for maintenance purposes.

Plastic Instrumentation Fittings and Tubing

Z-2 TUBE TURNS PLASTICS, INC., 224 East Broadway, Louisville, Ky., has introduced a new line of instrumentation fittings made of unplasticized polyvinyl chloride and, for use with them, corrosion resistant flexible tubing.

They are designed for long service life and are especially useful where corrosive atmospheres exist. Because of their corrosion resistant qualities, strength and low cost, the fittings and tubing can be advantageously employed in the instrumentation of chemical plants, hospitals, laboratories, and in the food and beverage processing industries.

Here, a quick, tight instrumentation connection is about to be made by means of a PVC union. Both the fitting and the flexible tubing are ¼ inch. Hand assembly cuts installation time and costs.

These new products permit an entire assembly to be put together by hand without the aid of wrenches, flaring or bending tools, or stretchers. And no sleeves or ferrules are involved. All that is needed is a knife or scissors to cut the tubing to the proper length.

The new PVC fittings will hold burst pressures in excess of those to which the flexible tubing may be subjected, and they cannot be overtightened by hand. The tubing itself is practically inert and is not affected by most acids and alkalies. It is extremely tough and durable, yet flexible enough, even at low temperatures, for easy handling and working. It is odorless, tasteless

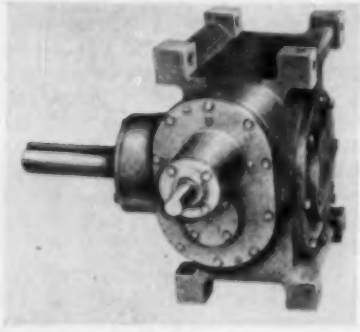
and non-toxic. The connections and tubing are unaffected by vibration and severe movement.

The fittings and tubing are furnished in both ¼" and ⅜" sizes. The types of fittings immediately available are half unions, for joining plastic to male pipe thread; unions and bulkhead unions for joining plastic to plastic; connectors for joining plastic to female pipe thread, and caps. Maximum working pressure is 150 psi at 75 F.

For more data circle item code number on the postage free post card—p. 17

New Speed Reducer For Conveyor Drives

Z-3 PHILADELPHIA GEAR WORKS, Philadelphia, Pa., has developed a new combination helical and worm gear speed reducer drive, that affords extreme versatility in selecting input and output shaft locations, for use in overhead, trolley, floor and pit type conveyors, and for similar industrial applications.



This newest HVUT reducer is mounted so that the output shaft is horizontal or vertical (either up or down) to suit mounting conditions, with input shaft at the horizontal right angle. This characteristic permits integration of the gear reducer unit into virtually any drive application.

These new units are available in a wide range of output speeds. Ratios utilizing 50:1 standard worm gear and helical reductions run up to 1800:1 (additional worm ratios are also available).

Changes in output speed can be made quickly and easily by changing the helical gears within the unit. The new units are available with mechanical-electrical shutoff devices for torque or overload protection.

THE BRAIDED PACKING INNOVATION OF THE MODERN AGE

Buy it

From your nearest Belmont Distributor

It's here now — ready to serve your needs — Belmont Crisscross Braid — acclaimed by packing users as the greatest braided packing advance in history.

This packing is new in design and construction. Each strand runs diagonally through the packing body at a 45 degree angle, unifying all strands into one complete packing structure which controls porosity while in service.

Belmont Crisscross Incorporates these Important Advantages

- will not *Unravel, Slough Off or Wear Through*
- gives you greater *Flexibility* without distortion in forming rings
- the lubrication is *Locked-In*
- its braided structure assures uniform *Controlled Porosity*
- you get *longer service life* because the solid integral braid results in a *stronger finished packing.*

When it *SEALS* right — stays TIGHT . . . you know it's Belmont made.

CLIP and Send Coupon 4-R-1

BELMONT PACKINGS

Butler & Sepviva Streets Philadelphia 37, Pa.

☐ Crisscross Braid Folder
☐ #54 Condensed Catalog
☐ #40 Catalog

Without obligation — send us information as checked:

Name ____ Title ____
Company ____
Address ____
City ____ State ____

☐ SEND NAME and ADDRESS of NEAREST BELMONT DISTRIBUTOR

Equipment . . Supplies . . Methods (Continued)

Sprayed Coil Dehumdifiers

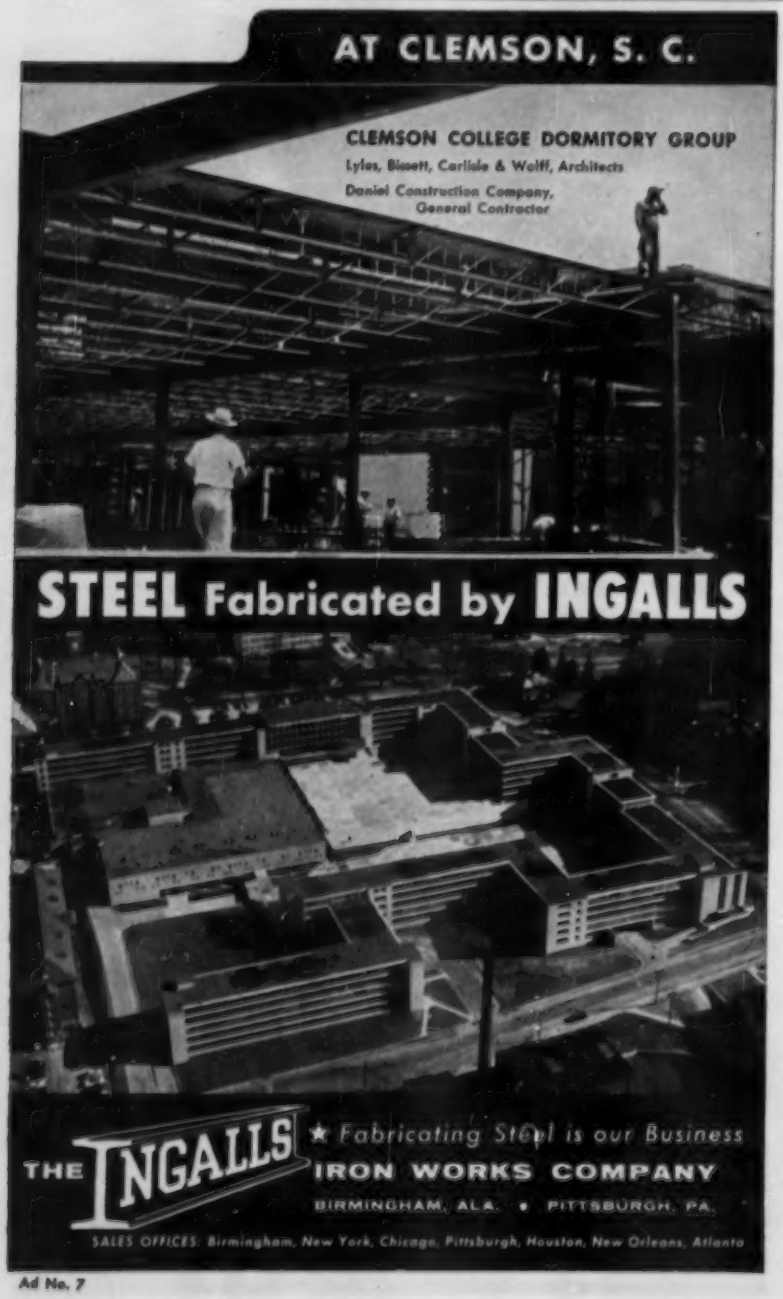
Z-4 AMERICAN BLOWER CORPORATION, Detroit 32, Mich., has developed new line of central station type sprayed coil dehumidifiers which feature heavy construction, complete accessibility and ease of maintenance.

A special access door on the air-output end of the new sprayed coil dehumidifier provides quick access to coils, drain trough and tank in that area. Coils themselves are removable from the unit either from the connection box side or from the air-intake or air-output end of the unit. The eliminators are also removable. Spray nozzles, float valve, strainer, coil face, drain troughs and tank are accessible through the air-inlet end of the dehumidifier.

The new units are available in standard arrangements having 1, 2 or 3 coils high and from 4 to 8 coil rows deep. Finned tube length can vary from 2 ft to 10 ft; coil face area from 4 sq ft to 83 sq ft; and capacity from 2,300 cfm up to 45,900 cfm. Recirculated spray water requirements for the new sprayed coil dehumidifiers range from 5 gpm for the smallest unit to 84 gpm for the largest.

Face and by-pass dampers are available for the new sprayed coil dehumidifier units as an optional accessory which is mounted in a frame for bolting to the unit's air-output face. A by-pass section of 18 gauge galvanized steel is furnished with the dampers to be bolted to the top of the casing. Interconnecting linkage between damper blades is provided to permit operation as a unit by the damper motor.

Drain troughs between the coils collect spray water from upper coil sections and return it directly to the tank through a downspout. With this arrangement lower coils are not flooded and maximum operating efficiency is maintained. Spray nozzles are the self-cleaning centrifugal type. They are brass and contain no cores, vanes or obstructions.


AT CLEMSON, S. C.
CLEMSON COLLEGE DORMITORY GROUP
Lyles, Bissett, Carlisle & Wolff, Architects
Daniel Construction Company, General Contractor
STEEL Fabricated by INGALLS
THE INGALLS IRON WORKS COMPANY
★ Fabricating Steel is our Business
BIRMINGHAM, ALA. • PITTSBURGH, PA.
SALES OFFICES: Birmingham, New York, Chicago, Pittsburgh, Houston, New Orleans, Atlanta
Ad No. 7

Secondary Air Damper in Low Horsepower Boilers

Z-5 CYCLOTHERM DIVISION, National U. S. Radiator Corp., Oswego, N. Y., has announced that a secondary air damper is now being incorporated in the blower housing of all Cyclotherm steam generators from 18 to 60 hp. Cyclotherm has added this feature, generally found only on larger size

boilers, to its entire line of low horsepower boilers.

The secondary air damper will make it simpler and easier to adjust the secondary air requirements of the boiler. The new damper can be adjusted more quickly than the old arrangement of adjusting blower vanes. In addition, the new damper gives a greater degree of accuracy in adjustment. This results in higher combustion efficiency.

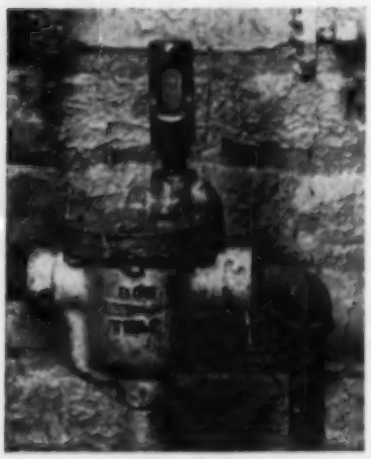
With the inclusion of secondary air dampers on these boilers, the entire line of Cyclotherm Steam Generators, from 18 to 500 horsepower, is furnished with this type of equipment. Cyclotherm boilers operate at pressures from 15 to 200 pounds per square inch. They require no stack beyond local and state minimum requirements.

All Cyclotherm Steam Generators are guaranteed to operate at efficiencies of 80 percent or greater, utilizing the firm's patented Cyclonic Combustion Principle.

For more data circle item code number on the postage free post card — p. 17

Steam Trap Test Plug

Z-6 VIS-A-PLUG, INC., Box 100, King of Prussia, Pa., offers a transparent plug which permits checking performance of steam traps at a glance.



The device fits in the standard test plug opening of the steam trap, as a permanent part of the trap. So equipped, traps may be checked for proper performance with a flashlight. On good traps, a fill and empty cycle occurs each time the trap dumps. But a blowing trap shows a steady continuous condition in the Vis-A-Plug glass.

ENDS MAINTENANCE

in general pump service

Single-stage, double suction DMV-DHV general hydraulic pumps are available for heads to 350 ft., capacities from 275 to 2400 gpm.

Double shaft seals and sealed ball bearings—standard equipment on **DMV— DHV** *pumps do away with stuffing box attention and bearing lubrication*

Now, with the DMV-DHV pump, you no longer have any stuffing box worries. There's no repacking! No annoying pump shaft leaks! The Double Mechanical Shaft Seals used are completely self-adjusting. They don't require attention throughout their entire service life.

Moreover, greasing or oiling of pump bearings is done away with. Modern Cartridge-Type Ball Bearings are employed—with the lubricant permanently sealed in. Here's another advanced feature that makes the DMV-DHV design the simplest, most maintenance-free pump ever developed by Ingersoll-Rand for general hydraulic service.

Greater Compactness is obtained with this modern construction using mechanical shaft seals and sealed bearings.

See your nearest Ingersoll-Rand representative for further information.

Ingersoll-Rand

10-290

Cameron Pump Division
11 Broadway, New York 4, N. Y.

PUMPS • CONDENSERS • TURBO-BLOWERS • COMPRESSORS • ROCK DRILLS
GAS & DIESEL ENGINES • AIR & ELECTRIC TOOLS

Equipment . . Supplies . . Methods (Continued)

Insulation Stands 1,800 F

Z-7 OWENS-ILLINOIS GLASS CO., Toledo, Ohio, has developed a new heat insulation product that withstands temperatures of 1,800 F. The new hydrous calcium silicate product, used primarily as covering for pipes and vessels, has the unique advantages of expanding slightly up to 1,100 F. Completely immersed in a test furnace, at 1,800 F, shrinkage is limited to about 1½%.

Kaylo-20, as it is called, is produced in a finger-nail pink color to distinguish it from O-I's standard Kaylo which is effective up to 1,200 degrees. This higher-temperature insulation, developed after several years of research and experimentation, approaches the refractory range and meets the requirements of the chemical, power and petroleum industries where increasingly high temperatures are encountered.

In addition to its heat control properties, Kaylo insulation is light in weight (11 pounds per cubic foot). It has enduring strength (under compression, 150 pounds a square inch). It is insoluble in water, and when dry, regains its original thermal efficiency and strength without shrinking or warping. Kaylo insulation is easily cut and sawed, making it adaptable to surfaces unconventional in size or shape.

The pipe insulation is produced in thicknesses and diameters for pipe sizes from ⅛ to 39 in. The block is made 36 in. long, in standard widths up to 18 in., and in thicknesses up to 3 in.

This 65' by 120' Armco Series P Building is used as a warehouse in Texas.

This 8' by 8' Armco Series S Building was installed by an Ohio power company.

These Industrial Buildings *GO UP FAST!*

Time is money, especially when industries have to wait while buildings are being erected. This is one reason why so many firms are turning to Armco Steel Buildings. They are shipped promptly and erected quickly.

ARMCO SERIES S BUILDINGS meet smaller structure requirements. They are supplied in clear-span widths from 4 to 40 feet, in a choice of heights, and almost unlimited lengths. Assembly is by fitting interlocking STEELOX panels together. Unskilled crews can handle the whole job.

ARMCO SERIES P BUILDINGS are designed for larger building needs. Widths range from 30 to 100 feet, a selection of heights, and practically unlimited lengths. They have a steel framework covered by corrugated metal sheets.

Both types may be supplied as Multiple-Span Buildings. Either type may be extended or dismantled and re-erected without loss of material. There's nothing to crack, warp or rot. And steel won't burn. Write us for more data.

ARMCO DRAINAGE & METAL PRODUCTS, INC.

DIXIE DIVISION
619 Forsyth Building • Atlanta, Georgia

SOUTHWESTERN DIVISION
C & I Life Building • Houston, Texas

Other Offices In Principal Cities

ARMCO®
ARMCO STEEL BUILDINGS

Send me data on Armco Steel Buildings:

I'm interested in a building _____ feet wide by _____ feet long.

NAME _____

ADDRESS _____

Combustion Analyzer

Z-8 BAILEY METER COMPANY, Cleveland, Ohio, has purchased the Cities Service Heat Prover Combustion Analyzer for oxygen and combustibles in flue gases, to become part of the Bailey line of instruments and control equipment for the economical use of fuels.

It will be manufactured and sold by Bailey as a portable testing device for the burning of solid, liquid, and gaseous fuels. The Bailey distribution policy will differ from that of Cities Service in that Bailey will sell rather than loan these combustion analyzers to those interested in testing and adjusting fuel burning equipment for maximum combustion economy. Cities

Service retains the right to continue Analyzer loan service to users of its petroleum products.

The Bailey Heat Prover Combustion Analyzer is identical to the former Cities Service Analyzer. It is a portable instrument weighing about 25 lb, designed to conduct an analysis of a gas sample for oxygen and combustibles gas content. The per cents by volume of these gases in the sample are continuously and simultaneously indicated on the instrument meters.

The complete package includes a sampling pump, hose and tip, as well as a thermocouple for measuring temperature. It operates on a 110v 25-60 cycle a-c power source. The oxygen and combustibles meters have both 4% and 20% range spans. This dual range feature affords greater instrument accuracy and sensitivity. The oxygen indicator is provided with an additional scale for measuring the output of the instrument thermocouple in degrees Fahrenheit.

Speed Lock Cover

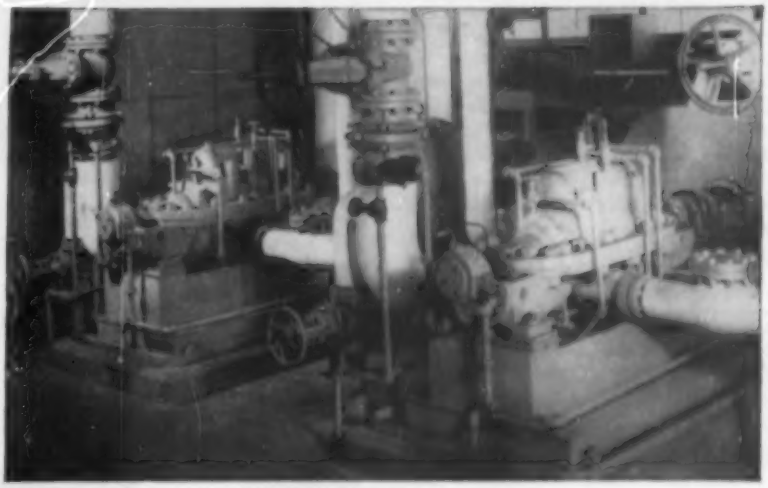
Z-9 SPARKLER MANUFACTURING COMPANY, Mundelein, Ill., announces that its new Passalaqua Speed Lock Cover will be standard equipment on all Model MCR retractable tank vertical plate filters.

The new, easy-to-operate safety cover is approved by ASME and has proven particularly useful for pressure vessels that require frequent opening.

The cover is locked by a series of visible bow-shaped lugs mounted on a

PRODUCTION CONTINUITY

Begins in the Boiler Plant



Warren Six Stage Boiler Feed Pumps installed at a Southern Board and Paper Mill.

Boiler Feed Pumps may look much alike, type for type, but it is well to keep in mind such intangible factors as:

- Experience and integri y of the manufacturer
- Dependability of product
- Know-how, Workmanship, Service
- Maintenance and Repairs
- Lost production due to down-time
- Early replacement because of "tight" original recommendations

It is impossible, of course, to get these items into your "specs," or the supplier into his "quotes," but don't overlook their importance with relation to price, possible future requirements and *production continuity*.

Get your share of "intangibles" . . . specify

P-44

WARREN QUIMBY PUMPS

WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC.

Warren, Massachusetts

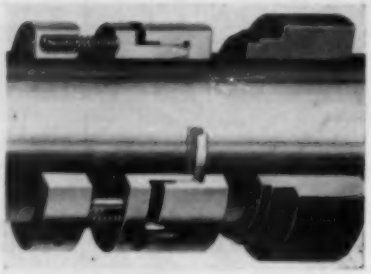
Equipment . . Supplies . . Methods (Continued)

third ring. The lugs are in direct rectangular shear. Even if one lug fails, the cover remains locked because the stress divides itself equally among the remaining lugs, which have a high safety factor.

The third ring locks in both the open and closed position. Engaging all holding devices is simultaneous and foolproof. The ring floats in roller bearings and its lugs are not under shear until internal pressure in the tank is built up.

Even in a large diameter tank, the ring travels through an arc of only 15 to 20 degrees. This enables the cover to be opened in seconds, without the use of hand tools or power devices. An O-ring sealing gasket is incorporated which gives a self-seal that becomes tighter in direct proportion to the increase in internal pressure.

For more data circle item code number on the postage free post card — P. 17



Rotary Mech. Seal for High Temperature Service

Z-10 DURAMETALLIC CORPORATION, 2104 Factory St., Kalamazoo, Michigan, has announced a rotary mechanical seal especially designed for high temperature service. This is a new development of the company's line of "Dura Seal" products that has achieved a high record of success in handling hot oils or hot water at temperatures up to 800° F. Two adaptations of the seal are offered, Type RHU—unbalanced assembly (illustrated) and Type PHU—balanced assembly.

Features include: Simplicity of design and ease of installing on new or existing equipment.

Design allows for thermal expansion to insure efficient performance. The seals do not require stuffing box flushing, unless to control vapor pressures in the box, or to flush out any excessive coke formation which might be encountered in high temperature applications.

Electrically Operated Steam Generators

Z-11 PANTEX MANUFACTURING CORPORATION, Pawtucket, Rhode Island, has announced a new line of electrically operated "packaged" steam generators, self-contained units which operate on the electrode principle of generating steam electrically. They are available in sizes from 1½ to 16 Bhp.

Applications are wherever precise control of high pressure steam tem-

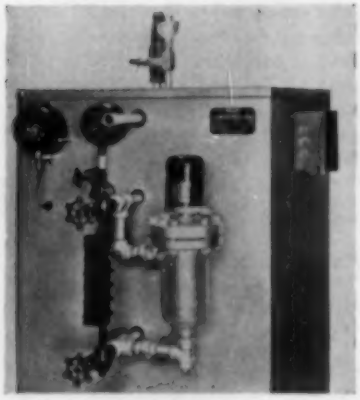
● Whatever your needs in pressure vessels—gas storage tanks, pressure spheres, creosoting cylinders, bubble towers, gas scrubbers, etc.—you can depend on COLE for tanks that are correct in design and permanently leakproof at the welded or riveted joints.

HIGH-PRESSURE VESSELS

R. D. COLE Manufacturing Co., Newnan, Ga.

- TANKS
- TOWERS
- CYLINDERS
- VESSELS
- STANDPIPES

COLE can furnish tanks made of steel, aluminum and stainless steel—built in accordance with ASME Code—to meet all insurance requirements. We invite your inquiries for high pressure storage tanks, elevated tanks, acid or oil storage tanks, bins, boilers, stacks, etc.

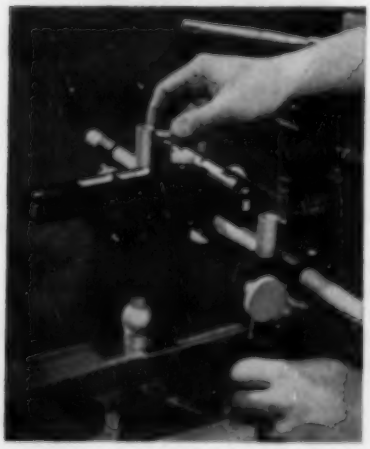


perature is desired, or in places where fuel-fired boilers create a hazard, or as supplementary steam sources for areas remotely located from central boilers.

Efficiency is reported to be 98½%. It may be operated on 220, 440, or 550 v power supply and offers special advantages to plants having 440 or 550 v power. For these voltages, the units require only 1/3 to ⅛ the floor space occupied by fuel-fired boilers of equal capacity.

Machine Tool Aligner

Z-12 KING INSTRUMENT CO., Dept. KP, 804 Northwest Bank Bldg., Minneapolis 2, Minn., has introduced a new precision aligner designed to obtain greater accuracy in the alignment of all machine tools in less time than is required by previous methods.



Developed for both production line checking and for use in machine tool rebuilding shops, the unit is adaptable to all machine tools without any additional parts. It is accurate up to .0003 of .001 per foot of extension and can measure parallel, horizontal and vertical alignment at the same time.

Your plant and equipment suffers . . . your community goodwill fades away. These problems can be solved. Prat-Daniel Collectors are designed for the control of industrial dusts and flyash. Multiple small diameter tubes provide powerful centrifugal forces, resulting in sustained high collection efficiency . . . even with ultra-fine dusts.

Whether the problem is industrial dust or flyash, you are assured of satisfaction with P-D Collector Systems, engineered to meet your specific needs.

Write for Reprint No. 102 titled, "What Type Collector?"

pd

Project Engineers
THE THERMIX CORPORATION
GREENWICH, CONN.
(Offices in 38 Principal Cities)
Canadian Affiliates: T. C. CHOWN, LTD., Montreal 25, Que., Toronto 5, Ont.

Designers and Manufacturers
PRAT-DANIEL CORPORATION
SOUTH NORWALK, CONN.
POWER DIVISION: Tubular Dust Collectors, Forced Draft Fans, Air Preheaters, Induced Draft Fans, Fan Stacks

new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

Winch-Hoist

Z-13 THE LUG-ALL COMPANY, Haverford, Pa., now offers an all new lightweight 2 ton winch-hoist with 20 ft of cable. It lifts, lowers or pulls 2 tons a distance of 10 ft when used double cable (as shown), or handles 1 ton a distance of 20 ft when used single cable.

This new Lug-All weighs only 15 lb and includes a rugged, protective type main frame of high grade aluminum alloys that allows instant inspection and easy cleaning, oiled-for-life bearings, stainless steel springs, three workable hooks, smooth operation in any position and a built-in pulley that can be used as a snatch block in close quarter work.

Safety is assured—the safety handle bends before the unit can be overloaded. An interlocking pawl system securely locks the load. There are no brakes. Free release only operates under no load conditions. A tamper-proof set-up can be obtained by simply removing the reversible handle.

All units are factory tested to 100% overload and are guaranteed for one year against defective parts and/or workmanship. The price for the new Model 4000 is $49.50, f.o.b. factory.

Hot Process Spray Valve

Z-14 GRAVER WATER CONDITIONING CO., 216 W. 14th St., N. Y., N. Y., has developed a completely new type of spray valve for use with its deaerating heaters and hot process softeners, which has resulted in new heights of efficiency for these units.

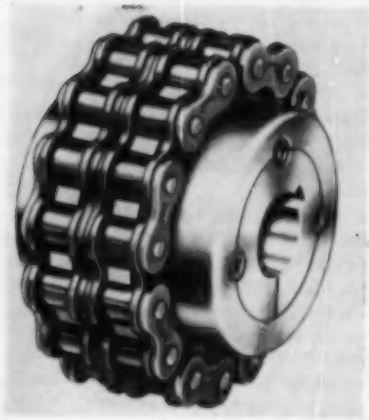
The main feature of the valve, is a parabolic plug of special construction which provides a constant flow angle under all conditions. By means of this plug an unvarying, even spray pattern is obtained with pressures and flow rates ranging from 3-150% of rating.

The valve is made of corrosion-resistant stainless steel, is non-sticking, and requires no maintenance. Its reliability having been proven in exhaustive pilot and actual plant tests, it is now an exclusive feature in all Graver deaerating heaters and hot process softeners.

Chain Couplings

Z-15 DODGE MANUFACTURING CORPORATION, Mishawaka, Ind., have recently added Taper-Lock Chain Couplings to the line of Taper-Lock Sprockets and Roller Chain, which has won wide acceptance since its introduction more than a year ago.

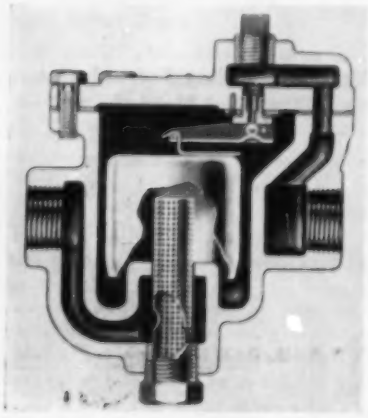
Seasons Greetings
We take time out to express our thanks and good wishes to all
MERRY CHRISTMAS and a HAPPY NEW YEAR
CATAWISSA VALVE & FITTINGS CO.
CATAWISSA • PENNSYLVANIA



The new couplings are of a flexible type and permit sufficient relative movement between the hubs to accommodate slight angular and parallel shaft misalignment. The coupling provides a strong and positive, yet compact, direct coupling of the shafts.

Bucket Steam Trap Withstands Loss of Prime

Z-16 SARCO COMPANY, INC., Empire State Building, New York 1, N. Y., is marketing the new Sarco inverted bucket steam trap, type B1-X.



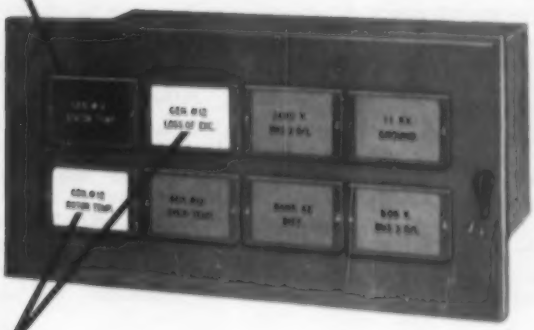
The possible loss of prime with consequent blow-thru of steam is a well-known inherent weakness in all inverted bucket steam traps. Sarco claims that its new design is superior in retaining prime under the most difficult operating conditions: light loads, rapid pressure drops, and partial vacuum in the return line caused by night shut-downs. For free bulletin and drawing, circle above code number on page 16 post card.

A DOUBLE BARRELLED TROUBLE SHOOTER

PANALARM "50VS"

VISUAL SEQUENCE ANNUNCIATOR*

1 VISUALLY INDICATES
first "off-normal" and subsequent "off-normals".



2 SEQUENTIALLY GROUPS
related variables for easy interpretation.

Troubleshooting in complex processes can be expensive and time consuming. The Panalarm "50VS" Visual Sequence Annunciator *eliminates guesswork . . . pinpoints trouble.* It immediately flashes the cause of trouble; instantly shows resultant "off-normals", and provides a means of grouping and acknowledging related variables so that minimum interpretation is required . . . quick, direct corrective action can be immediately taken.

Your present Universal Panalarm "50" Annunciator System can be changed to provide visual sequence signals. This flexibility prevents obsolescence . . . has made the Panalarm "50" the most versatile audio-visual annunciator available today.

PANALARM "50VS" gives CONTROL INFORMATION

- The primary cause of trouble . . .
- Secondary "off-normals" resulting . . .
- Sequential follow-up of "off-normal" . . .

Send for Bulletin 6-A.
LISTED BY UNDERWRITERS' LABORATORIES

PANALARM
Alarm and Safety Division

PANELLIT, INC.
7419 N. Hamlin Avenue, Skokie, Illinois

PANALARM
PANELLIT

*U.S. Patent No. 2701872 Copyright 1955, Panellit, Inc.

(Starts Page 10)

E. A. Phoenix of J-M Dies in Tragic Accident

E. A. PHOENIX, Manager of the Johns-Manville Market Surveys Department in charge of plans for the market development of all Johns-Manville products and the study and analysis of markets and methods of distribution, new businesses, new product lines, and other related problems, died recently in a tragic accident.

Mr. and Mrs. Phoenix were both drowned during the recent disastrous floods in the northeastern states. Their car was swept off a small bridge spanning the Saugatuck River while returning to their home at Diamond Hill Road, Redding, Connecticut. They are survived by a 13 year old son, Edward A. Phoenix, Jr.

Mr. Phoenix began his business career with the Kieselguhr Company of America in 1915. This firm later became The Celite Products Company which became part of Johns-Manville Corporation in 1928. After serving in various sales and advertising positions, Mr. Phoenix was made Assistant Sales Promotion Manager in April, 1936. In May, 1942, because of his knowledge of the company's widely diversified product lines, he was transferred to the Priorities Department, and held that post until his promotion to Assistant Manager for Transite Pipe in 1943. He was appointed Manager of the J-M Market Surveys Department in 1951.

Journalist Merle Thorpe Dies

MERLE THORPE, for many decades widely known as an author, editor, teacher, lecturer, business philosopher and business executive, died of cancer in late October.

In 1916, Mr. Thorpe founded Nation's Business magazine, official publication of the United States Chamber of Commerce. He edited and published that publication, in Washington, D. C., continuously until his retirement from the Chamber in 1944.

Following his retirement from Nation's Business in 1944, Mr. Thorpe joined Cities Service Company as a member of its board of directors and as its Director of Business Development, maintaining offices in Washington, D. C., and New York. In this capacity he founded Service Magazine, leading house organ of the Cities Service system, which has won numerous awards for excellence in magazines of the house organ field.

Walworth Company Purchases Southwest Fabricating—Tex.

Acquisition by the WALWORTH COMPANY of the assets and business of the SOUTHWEST FABRICATING & WELDING CO., INC., Houston, Texas, one of the leading pipe fabricating companies in the United States, has been announced.

Southwest Fabricating supplies important markets throughout the world in the oil, chemical, petro-chemical and natural gas fields. Southwest will be operated as a subsidiary of Walworth, retaining present management and employes and continuing present policy.

Harbison-Walker Refractories New Maryland Plant

The HARBISON-WALKER REFRACTORIES COMPANY has opened a new plant at Leslie, Md., to produce silica refractories.

The plant is a 100,000 sq ft standardized steel structure produced and erected by the Luria Engineering Company of Bethlehem, Pa. It was modified structurally to accommodate several elevated grinding and screening machines and one of the longest tunnel kilns in the world.

Kerrigan Announces Expansion Plans

KERRIGAN IRON WORKS, INC., Nashville, Tennessee, have announced expansion plans for their main offices. Construction is under way for a two-story brick addition. This new building is necessary to provide space for their new Greulich Bridge Flooring Division and expansion in the Street Light Standard Division.

install
peak performance
into your
compressors (AIR · GAS · AMMONIA)

Peak performance, maximum efficiency, greater output, and lower power costs can be built into your oldest, and of course your newest, compressors by the installation of VOSS VALVES.

Check THESE VOSS VALVE ADVANTAGES:

- Quiet, vibration-free operation
- 20 to 60% more valve area
- less power consumption
- minimum pressure loss
- normal discharge temperature
- lower operating costs
- utmost safety

Our detailed proposal for increasing the efficiency of your compressor will be sent you without obligation. Send us the name, bore, stroke, and speed of your machine.

VOSS VALVES / J. H. H. VOSS Co., Inc. 784 East 144th Street, New York 54, N.Y.

Expansion plans also include a 160-ft addition to their river plant, made necessary by the steady growth of the grating division. When complete the new addition will increase the length of the river plant to 600 ft. This building also houses a machine shop which is being expanded.

Kerrigan Iron Works, Inc., has grown from an exclusive ornamental iron shop into one of the nation's largest manufacturers of open steel flooring, with 3 plants and main offices in Nashville, General Sales Offices in New York City and representatives in principal cities. They also manufacture bridge flooring, street lighting standards and mast arms and brackets for utility poles. In addition, a large number of open end steel drums are manufactured for the petrochemical industry.

Reynolds Metals—Richmond

REYNOLDS METALS COMPANY has completed installation of its first 78 inch wide 4-high aluminum foil rolling mill in its foil rolling plant at Richmond, Va.

The new mill is believed to be the widest foil mill in operation in the United States. It is the first in a series of similar mills to be installed in the company's Richmond and Louisville plants.

Combustion Engineering New River Dock

A special river dock recently constructed for COMBUSTION ENGINEERING, INC., at the firm's Chattanooga plant on the Tennessee River makes possible barge shipments of equipment too heavy for rail through most of the inland waterways and to all coastal points.

Built by Dravo Corporation, Pittsburgh, under a contract from the Industrial Steel Erection Company, Chattanooga, the new dock will play an important part in transporting nuclear power equipment, built at Combustion Engineering's plant, and will facilitate shipment and receipt of other items.

G-E Rectifier Plant—Va.

A GENERAL ELECTRIC COMPANY plant costing in excess of $5,000,000 will be built at Lynchburg, Va., as the new home for the Company's Rectifier Department, now located at Lynn, Massachusetts, and at Limerick, Maine.

Grading of the plant site will begin in November, and actual construction will start in March, 1956. Initial production is scheduled for January, 1957.

The plant will eventually employ about 800 persons, more than 600 of whom will be hired from the local area.

Perfection Acquires Knox Metal Products Co.

As part of a progressive expansion program, PERFECTION INDUSTRIES, INC., announces that it has purchased the Waynesboro, Ga., plant of the KNOX METAL PRODUCTS CO.

The Waynesboro plant will be headed by JOHN GARDNER as general manager. He is a 34-year veteran with Perfection and came up through the manufacturing division of the company. For the past 11 years he has been Perfection's industrial relations director.

It is anticipated that the Waynesboro plant will employ 150 to 200 local workers, supervised by key personnel transferred from Perfection's two Cleveland, Ohio, plants.

Cambridge Wire Cloth Southeastern Sales Engineer

THOMAS M. CREEL has been appointed Sales Engineer for the CAMBRIDGE WIRE CLOTH COMPANY, Cambridge, Maryland, to cover the seven-state southeastern territory.

Mr. Creel will represent the full Cambridge line, consisting of woven wire conveyor belts, industrial wire cloth and special metal fabrications. His headquarters will be at 333 Candler Building, Atlanta, Georgia.

LeTourneau Appointments

JOHN E. MCCAUSLAND has been named to the sales management staff of R. G. LETOURNEAU, INC., of Longview, Texas.

VETCOA SUPPLY CORPORATION, Phoenix, Ariz., has been appointed distributor of electric hoists and jib cranes for the Arizona area; and W. E. RICHARDSON MACHINE COMPANY, INC., Birmingham, Ala., has been appointed distributor of electric hoists and jib cranes for the Alabama area.

KEN KENNEDY SAYS . . .
HERE'S OUR NEW WAREHOUSE IN THE INDUSTRIAL SOUTH . . .
KENNEDY VALVE
SOUTHERN BONDED WAREHOUSE
367 JOHN ST., N.W.
ATLANTA 2, GEORGIA
TELEPHONE, LAMAR 3421
• THE 78-YEAR OLD NAME IN QUALITY VALVES •
BRASS VALVES
in sizes ¼" thru 3"
Gate—Globe and Angle—including "500 Brinell" Stainless Steel Disc and Seat.
IRON-BODY VALVES
in sizes 2" thru 48"
Double-Disc—Solid Wedge—Globe and Angle.
FIRE HYDRANTS
SAFETOP
Two-piece standpipe and stem. Patented Safety Breakable traffic model.
STANDARD
One-piece standpipe and stem suitable for installation in protected areas.
Distributors are invited to write direct concerning open territories.
THE KENNEDY VALVE MFG. CO. • ELMIRA, N. Y.
VALVES • PIPE FITTINGS • FIRE HYDRANTS
OFFICE AND WAREHOUSES IN NEW YORK, CHICAGO, SAN FRANCISCO, ATLANTA. SALES REPRESENTATIVES IN PRINCIPAL CITIES

News (continued)

Johns-Manville New Operating Divisions

JOHNS-MANVILLE will split its present Industrial Products Division into three new operating divisions which will comprise a new industrial products group headed by a senior Vice President.

The expansion in organization, which becomes completely effective January 1, 1956, continues the decentralization of operations started in 1946 and backed by a continuing plant and mine expansion program in which about $20,000,000 has been invested each year since the end of World War II.

The three new operating divisions comprising the industrial products group will be known as the Industrial Insulations Division, the Packings and Friction Materials Division and the Pipe Division, each headed by a General Manager and staff.

Petroleum Electric Power Assoc. Elects New Officers and Directors

The **Petroleum Electric Power Association** recently held its 27th Annual Meeting in Dallas, Texas. **W. L. Pearson, Southwestern Public Service Company,** Amarillo, Texas, president of the P.E.P.A., presided. Corpus Christi was chosen as the site for the May, 1956 meeting.

New officers and Board of Directors for 1956-57, elected at the Association's convention include, left to right: **J. F. Maddox, New Mexico Electric Service** (Secretary-Treasurer); **F. R. Woerner, Texas Electric Service Company** (Vice President); **Harvey Cherry, Houston Lighting & Power Company** (Director); **U. H. Ohrman, Texas Power & Light Co.** (Director); **Fred Clarke, Arkansas Power & Light Co.** (President); and **W. A. Thomson, Gulf States Utilities Co.** (Director).

ALLPAX RINGS THE BELL!

ALLPAX Rings the Bell with the development of precision packing rings, designed for performance, and made of the finest materials available. Whether open-end or solid molded type, ALLPAX packing rings are precision made to your exact specifications. They increase efficiency because they give better service. Sample rings sent upon request.

SEND FOR OUR NEW CATALOG TODAY!
See our complete line of packings, tools, and gasket materials. Distributors in principal cities.

THE ALLPAX COMPANY
160 Jefferson Ave. • Mamaroneck, N. Y.

Bovay Engineering Firm In New Headquarters—Tex.

The professional engineering firm of H. E. BOVAY, JR., Consulting Engineers, has moved into its own building at 5009 Caroline Street, Houston, Texas.

The Bovay organization, which has its general offices in Houston, will continue to maintain space in the Esperson Building for the convenience of its clients in the downtown area.

Branch offices of the Bovay firm are located in Spokane, Washington, and in Baton Rouge, Louisiana. The general office in Houston maintains a staff of approximately eighty engineers together with the necessary drafting and clerical assistance. The Baton Rouge office is supported with design assistance from the Houston office and thus operates with a smaller staff. Consulting service is furnished to clients from Canada to Central America.

Laclede-Christy Appointments

LACLEDE-CHRISTY COMPANY, Division of H. K. Porter Company, Inc., has announced the appointment of DELMER C. WRIGHT as Field Sales Representative in the Birmingham, Alabama, territory. Mr. Wright will sell all four lines of Laclede-Christy

Refractories, upon completion of a one month's Product and Sales training program in St. Louis. He replaces H. D. Roach, resigned.

KENNETH S. PATTON has been appointed Sales Representative in the Oklahoma area. He will live in Oklahoma City and serve Laclede customers in Oklahoma, northern Texas, western Arkansas, and southern Kansas.

Fairbanks Appointments

The FAIRBANKS COMPANY has announced the assignment of ROLAND A. GOTSCH to the Lower Illinois, Kansas and Missouri Sales Territories. In his new territory Mr. Gotsch will sell the complete Fairbanks line—Bronze and Iron Body Valves, Two Wheel and Platform Hand Trucks, Industrial Casters and Wheels — and Dart Unions, for which Fairbanks is the exclusive sales agent. Mr. Gotsch will make his headquarters in St. Louis.

Westinghouse Lamp Div. South Central Manager

WAYNE D. BAKER has been appointed manager of the South Central sales district of the WESTINGHOUSE LAMP DIVISION. In his new position, Mr. Baker will make his headquarters at New Orleans, and will be responsible for Westinghouse lamp sales in Louisiana, southern Mississippi, the southwestern corner of Alabama, and western Florida.

E. J. Fox Given New Appointment—Houston

The appointment of E. J. Fox as assistant works manager of CARBIDE AND CARBON CHEMICALS COMPANY, a Division of Union Carbide and Carbon Corporation, has been announced by H. D. Kinsey, vice-president of Carbide and Carbon Chemicals Company.

Mr. Fox has been with the Corporation since 1930, when he joined Carbide and Carbon Chemicals Company, at South Charleston, as a production engineer. He subsequently moved to department head and then Chemical Area supervisor. Later he became assistant plant superintendent, at Texas City, and superintendent of the butadiene plant operated for Rubber Reserve at Louisville, Ky. In 1946, he returned to his former position in Texas City and became plant superintendent in 1952.

Westinghouse Dedicates Raleigh Meter Plant

Gwilym A. Price, president of WESTINGHOUSE ELECTRIC CORPORATION, officially dedicated the company's huge new watthour meter plant in RALEIGH, NORTH CAROLINA, in brief ceremonies held in late October.

Virtually all equipment and machinery is brand new, and 675 of the plant's present 750 employes were recruited from the Raleigh area.

For the immediate future, the plant payroll will run about $2,700,000 annually. When full production is reached, it is expected that about 2500 men and women will be employed, with an eventual payroll of nearly $9,000,000.

Situated on a 100-acre tract of land, the new watthour meter plant houses over 500,000 sq ft of manufacturing space under a 13-acre roof. Two-thirds of the huge building is air conditioned, to provide optimum environment for precision processes and personal comfort. Construction of the plant was begun in November, 1952, and manufacturing operations began last year.

Westinghouse products to be made in the Raleigh plant include the complete line of watthour meter apparatus and mounting equipment for residential, commercial and industrial use.

Southeastern Sales Manager Houdaille-Hershey—Memphis

CARL F. HOLLAND has been appointed Southern District Sales Manager for HOUDAILLE-HERSHEY OF INDIANA, INC. He will supervise sales in 13 southern states plus Missouri, Kansas, Oklahoma and southern Illinois. Prior to his promotion Mr. Holland was the company's sales representative in the Columbus, Ohio, area. His headquarters in his new position are in Memphis, Tennessee.

Houdaille-Hershey of Indiana manufactures oil and coolant filters for diesel, hydraulic, metal-working, turbine, power generating and other industrial equipment. Home offices are in Lebanon, Indiana.

for
BIGELOW ★
BADENHAUSEN ★
CASEY HEDGES ★
CONNELLY ★
COMBUSTION ★
COLLINS ★
EDGEMOOR ★
ERIE CITY ★
HEINE ★
FOSTER WHEELER ★
KIDWELL ★
KEELER ★
LADD ★
MAXIM ★
ROSS ★
RUST ★
SPRINGFIELD ★
STIRLING ★
TITUSVILLE ★
UNION IRON WORKS ★
VOGT ★
WICKS ★
and others

any size . . . any boiler

You can get the tubes you need, right now . . . if you order your replacements from B.T.A. Yes, you save time, money, headaches, because B.T.A. carries the most complete range of sizes . . . regular or heavy gauges . . . for any make of boiler. No need for costly shut-downs—phone or wire!

Philadelphia
Tampa
Los Angeles

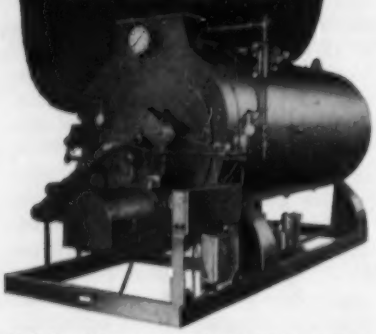
2A

BOILER TUBE CO. OF AMERICA
McKEES ROCKS, (PITTSBURGH DISTRICT) Federal 1-7750

SIMPLIFIED MAINTENANCE SENDS COSTS DOWN

CYCLOTHERM

Steam and Hot Water Generators

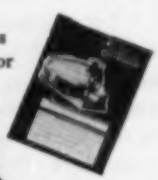


Cyclotherm Steam and Hot Water Generators range from 16 to 800 hp . . . from 15 to 200 psi.

Cyclotherm's simplified maintenance sends costs down as much as 50%. Reduces hours of "down time" to minutes. Any maintenance man can clean return tubes . . . replace and clean burner nozzle. Firetube never needs cleaning.

A minimum 80% efficiency is guaranteed. Cyclotherm burns oil and/or gas. Gives 66% more steam generating power per sq. ft. Is up to ⅓ smaller than other packaged boiler units. Can be installed in minimum boiler room space . . . with only 5 simple connections.

Write today for your free booklet which shows how Cyclotherm Steam or Hot Water Generators can cut your costs.



YEARS AHEAD IN STEAM GENERATION

CYCLOTHERM®

Steam & Hot Water Generators

Cyclotherm Division National—U. S. Radiator Corp.
2224 E. First Street
Oswego, N. Y.

News (continued)

Walters Appointed Infilco Sales Representative

JOHN G. WALTERS has been appointed Infilco Sales Representative for Georgia, North Carolina and South Carolina. INFILCO INC. manufactures water and waste treating and filtering equipment.

John G. Walters

Mr. Walters, born in Massey, Md., thirty years ago, has a Bachelor of Science Degree in Chemistry and Biology from Washington College, Chestertown, Md., and a Master of Arts Degree from Teachers College of Columbia University. He took premed courses at Temple University School of Medicine and studied a year at Johns Hopkins University, Dept. of Sanitary Engineering, Baltimore, Md.

After two years in the Army, Mr. Walters became the first field representative for the Maryland Water Pollution Control Commission and conducted a pollution abatement program for the state. Before joining Infilco in 1953 he served industry as a consultant on waste disposal.

This background equips him for his new position with Infilco, as the company is engaged aiding rapidly expanding industry in treating industrial wastes for stream pollution abatement.

Allis-Chalmers—Richmond

R. G. RICHARDS has been assistant construction machinery sales manager at the Richmond, Va., branch for the Construction Machinery Division, Tractor Group, ALLIS-CHALMERS MANUFACTURING COMPANY.

He was formerly a construction machinery salesman at the Atlanta, Ga., branch where he joined the company in 1954. Prior to that he was with a construction machinery dealer in Atlanta and with contracting firms in Illinois.

District Manager for Beaver

BEAVER PIPE TOOLS, INC., Warren, Ohio, manufacturers of pipe threading, grooving and cutting equipment, has announced the appointment of WILLIAM H. VAUGHT, SR., as District Manager.

His territory will include Kentucky, West Virginia, Southern Ohio and Southern Indiana. His office and residence are in Cincinnati, Ohio.

L.O.F. Glass Fibers Atlanta Regional Office

A new, more aggressive sales program for the Corrulux Division of L.O.F GLASS FIBERS COMPANY was outlined by J. S. Finger, vice-president and general manager, during the General Sales Meeting held at the Shamrock-Hilton Hotel in Houston. The program included new advertising and promotion plans and coincided with the opening of regional sales offices in Atlanta, Ga., and Burbank, Calif., and the appointments of additional sales personnel.

Personnel appointments included Thomas O. McCullough as general sales manager and Ralph W. Burdeshaw as Southeast regional manager with offices in Atlanta. RALPH G. COX was appointed sales manager of the Southeastern region and Randolph H. Barnard, Jr., was made Field Representative in that region's Charlotte, N. C., office.

Cameron & Barkley to Stock Stainless Pipe and Tube

THE CAMERON & BARKLEY CO., leading Southeast industrial distributor with branches in Charleston, S. C.; Savannah, Ga.; Jacksonville, Orlando, Tampa and Miami, Florida, announces its appointment as an authorized distributor for BABCOCK & WILCOX welded and seamless stainless steel tubing and pipe.

Major stocks of B & W tubular products will be maintained at Jacksonville, thus permitting overnight delivery to all industrial centers in Florida, Georgia and South Carolina. According to Mr. Rufus Barkley,

company president, the addition of B & W corrosion and oxidation resistant tubing and pipe to their existing stocks of Cooper Alloy stainless steel valves and fittings, Carlon plastic pipe, Tube Turns Plastics fittings, Lunkenheimer plastic valves, and Hills McCanna corrosion resistant diaphragm valves, is in line with the company policy of building their stocks to serve the fast-growing chemical, paper and pulp, food and other process industries in the South.

Bay State Abrasive Adds to Southern-Southwestern Staff

JAMES A. TURNIPSEED, JR., Birmingham, Ala., has been appointed an Abrasive Engineer for North Carolina, South Carolina, Tennessee, Northern Alabama and Eastern Arkansas for BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass.

Prior to this appointment Mr. Turnipseed was an Abrasive Engineer for the Sterling Grinding Wheel Co., Tiffin, Ohio. He is a Mechanical Engineering graduate of Alabama Polytechnic Institute and was a major in the U. S. Army in World War II.

Houston Technical Laboratories New Building

Construction has begun on the new main plant for HOUSTON TECHNICAL LABORATORIES, Texas Instruments geophysical instrumentation subsidiary. The 40,000 sq ft completely air conditioned building is being built on a five-acre tract on Buffalo Speedway in Houston.

When the modern new building is completed next spring, HTL will be able to consolidate its research, design, and manufacture operations now being carried on at 2424 Branard and several rented buildings in Houston. Houston Technical Laboratories is the Petroleum Instrumentation division of Texas Instruments Incorporated, Dallas.

Houston Technical Laboratories produces a wide range of geophysical instruments for sale to the petroleum and mining industries. These include the lightweight Worden gravity meter—of which more are sold than all other types combined — and seismic equipment such as the Very Low Frequency, 7000, High Resolution, and magneDISC magnetic recording systems. Highly precise components such as quartz springs and optical lenses and mirrors similar to those required in the geophysical equipment are also manufactured for the instrument industry at large.

When HTL was purchased by Texas Instruments Incorporated in December of 1953 its main output was in gravity meters. In 1954 the design, manufacture, and distribution of seismic instruments formerly handled by TI in Dallas was transferred to Houston Technical Laboratories. Further expansions in activity have made the new and larger main building necessary.

All-State Welding Southern Division Office

A Southern Division office of ALL-STATE WELDING ALLOYS CO., INC., has been established at 3 Pamona Drive, Birmingham 9, Alabama.

CHARLES BROWN has been appointed Manager of the Southern Division. He will have supervision of All-State regional offices at New Orleans, St. Louis, and Concord, Tenn., in addition to the one at Birmingham.

Ladish Purchases Los Angeles Plants

LADISH CO., Cudahy, Wisconsin, prominent manufacturer of Controlled Quality drop forgings, pipe fittings and rolled rings has announced the purchase of two adjacent Los Angeles, California, manufacturing plants: CBS STEEL AND FORGE CO. and GENERAL PACIFIC CORP. The plants will operate as the Ladish Pacific Division, Ladish Co.

Broad improvements in methods, equipment and quality controls are being instituted to bring to West Coast fitting and forging buyers new standards of manufacturing uniformity and metallurgical integrity.

What's your need for heat?

Whatever your heating job may be, you'll find the efficient, economical answer in . . .

CHROMALOX
Electric Heaters

. . . for heating platens, dies, molds, metal parts . . . for heating liquids, air, gases . . . for curing, drying, baking . . . for comfort heating in offices and factories . . . for special applications . . . in fact for any application requiring fast, low-cost, controlled heat up to 1100°F.

IMMEDIATE DELIVERY

from the world's largest factory stock of industrial electric heaters . . . over 15,000 types, sizes and ratings.

Let the Chromalox Sales-Engineering staff solve your heating problems . . . electrically.

Write for your copy of Catalog 50

Contains helpful information on design uses, and prices of Chromalox Electric heaters, elements, thermostats, contactors and switches.

To get some interesting facts about additional applications of electric heat, ask for Booklet F1550—"101 Ways to Apply Electric Heat."

Edwin L. Wiegand Company

7563 Thomas Boulevard, Pittsburgh 8, Pennsylvania

EDWIN L. WIEGAND COMPANY
7563 Thomas Boulevard, Pittsburgh 8, Pa.

I would like to have—

☐ A copy of Catalog 50
☐ A copy of "101 Ways"
☐ A Sales-Engineer contact me

Name _____

Company _____

Street _____

City _____ Zone ____ State _____

A-44558A

SALES ENGINEERING REPRESENTATIVES — Atlanta 3, Ga.—C. B. Rogers and Associates, 1000 Peachtree St., N. E.; Charlotte 2, N. C.—Ranson, Wallace & Co., 115½ East Fourth St.; Dallas 26, Texas—L. S. Ward Co., 8600-11 Canton St.; Houston 1, Texas—L. S. Ward Co., 1014 Texas Ave.; Nashville 4, Tenn.—H. S. Miles and Associates, 2509 Franklin Road.

Increased Production 50% With Speed-Trols

Through use of a Speed-Trol Variable Speed Drive on a screw conveyor for loading a 45-ton bucket elevator, the Red Top Gin Co., Blytheville, Ark., is able to more efficiently process both green and dry soy beans. With Speed-Trol we maintain full capacity production throughout the soy bean season and have increased production 50%, reduced spoilage 20%, decreased labor costs 30% and greatly improved employee morale, reports A. J. Boyt, Foreman.

STERLING SPEED-TROL

GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

Equipment adaptation to: Sequence synchronization — operators' abilities — load variations due to differences in quantity, quality, weight, size, tension, hardness or shape of material to be processed, machined, conveyed, blended, mixed, etc.

Process control of: Temperature — viscosity — level — pressure — flow — etc.

Time control of: Baking — drying — heating — cooking — pasteurizing — soaking — chemical action — etc.

With Speed-Trol you get the maximum in production, plant efficiency, quality & profit.

20-page illustrated catalog... Sterling Speed-Trol, Slo-Speed, Klosd and Klosd-Tite Electric Power Drives. Write for catalog No. 209.

STERLING ELECTRIC MOTORS

Plants: New York City 51; Chicago 35; Los Angeles 22; Hamilton, Canada; Santiago, Chile
Offices and distributors in all principal cities

News (continued)

Infilco Promotes Kominek

EDWARD G. KOMINEK has been promoted to the position of General Sales Manager of INFILCO INC., one of the nation's leaders in engineering and manufacturing of equipment for the treatment, handling and measurement of liquids.

Edward Kominek

In his new position Mr. Kominek will have general supervision of all sales representatives in the country for Infilco Inc., as well as for Infilco Canada, Infilco Mexicana and offices in other foreign countries. His headquarters will be at the main office in Tucson, Arizona.

Ft. Worth Steel & Mach. Elects New Officers

GEORGE A. JAGGERS was recently named president of FORT WORTH STEEL & MACHINERY COMPANY and former president J. D. BRANCE became chairman of the board.

Their election followed the company's expansion with acquisition of Monarch Manufacturing Company and its division, The Armoloy Company, both of Fort Worth. Mr. Jaggers has been president both of Monarch and Armoloy.

Fort Worth Steel & Machinery manufactures and distributes nationally a variety of "Fort Worth" products used in industry—including V-belt and roller-chain drives and other types of power-transmission equipment; screw conveyors and other types of materials-handling machinery, and specialized machinery for vegetable-oil-extraction plants.

The company has main offices and factory at 3600 McCart Street in Fort Worth, a foundry in Dallas and sales offices and distribution warehouses in 10 strategic locations elsewhere across the nation. It has about 350 employes.

Monarch's principal business has been manufacturing specialized materials for the Armed Services' training of troops. Armoloy, formed last year, offers to industry generally a process for armoring moving metal surfaces to increase their life.

Pritchard Representative Richmond, Virginia

W. H. KIDD AND COMPANY of Richmond, Virginia, has been appointed sales representative for the State of Virginia by J. F. PRITCHARD & COMPANY OF CALIFORNIA, Kansas City, Missouri, manufacturer of cooling towers for air conditioning and industrial applications and Pritchard Hydryers, packaged dehydration units for drying air or other gases.

The Kidd organization was founded in 1948 by W. H. Kidd. Mr. Kidd graduated from the Massachusetts Institute of Technology with a degree in chemical engineering. After graduation from M I T, he attended Washington and Lee University. For over ten years he served as sales representative in the East for the Foxboro Company.

Another member of the Kidd Organization is R. E. Easter, a graduate of Michigan State with a degree in mechanical engineering.

Bailey Meter Company Central Station Manager

CHARLES F. BIRCHLER, sales department, BAILEY METER COMPANY, has been named manager of the company's Central Station Division. Birchler will co-ordinate the company's sales activities in this field.

Bailey, whose headquarters are in Cleveland, manufactures industrial instruments and automatic controls for power and process industries.

Graduated from Purdue University in 1924, with a bachelor of science degree in mechanical engineering, Birchler joined the company at that time. Prior to coming to the Cleveland Main Office in 1927, he worked as a sales-service engineer in the Kansas City and Houston district offices. Birchler is a Registered Professional Engineer in the State of Ohio.

Edison District Office Established in Atlanta

In recognition of the extensive post-war growth in the use of industrial storage batteries in the southeastern states and as a means of improving the company's service to users, the EDISON STORAGE BATTERY DIVISION of THOMAS A. EDISON, INCORPORATED, has established a district office in Atlanta. E. L. KRAUSS has been appointed district manager.

E. L. Krauss

The territory served by the new district office includes Alabama, Florida, Georgia, South Carolina, the eastern part of Tennessee and the extreme western part of North Carolina.

Personnel assisting Mr. Krauss include DONALD G. VAN HOUTEN, field service engineer, with headquarters in Atlanta and S. E. WOMELDORPH, field service engineer with headquarters in Mt. Olive, Alabama.

Delta Power Tool Southern District Managers

New district sales managers for two Southern areas have been named by ROCKWELL MANUFACTURING COMPANY'S DELTA POWER TOOL DIVISION, according to an announcement by THOMAS C. MORTIMER, Southern regional sales manager.

U. E. "ED" MCCARTY, north TEXAS district sales manager for the past three years, has been appointed sales manager for a district including most of Georgia, the Carolinas, Eastern Alabama and Eastern Tennessee. He succeeds Howard L. Rose, who retired recently.

Mr. McCarty will make his headquarters at Delta's Southern regional sales office in Atlanta. A native of Tupelo, Miss., Mr. McCarty attended Union University, Jackson, Tenn., and later served as a captain of field artillery in the U. S. Army. He joined Rockwell in 1953.

JOHN M. BANNON, JR., a native of Crafton, Pa., and a 1952 graduate of the University of Notre Dame, was appointed North Texas district sales manager, replacing Mr. McCarty. Prior to joining Rockwell, Mr. Bannon spent 11 years with the Studebaker Corporation and a year with Thor Power Tool Company.

Bainum District Manager for Philip Carey

C. J. BAINUM has been appointed manager of the St. Louis and Southwest districts of the Philip Carey Mfg. Co. He will also take an active part in the development of the Carey plant at Houston, Texas.

Benedict Engineering Representative of Lamson

LAMSON CORPORATION, Syracuse, New York, announces the appointment, as Sales Agent, the BENEDICT ENGINEERING AND SALES COMPANY, Birmingham, Alabama. They will represent the full line of skate wheel, light and heavy-duty gravity roller, live roll and belt, overhead conveyors, Under-Tow-Ers and the Lamson Airtube message handling systems in the states of Alabama, Mississippi and the northwestern counties of Florida.

M. Benedict

Mr. Benedict, president, has had twenty year's experience in the materials handling and power transmission fields. He was formerly chief engineer of the southern division of Rust Engineering Company. Prior to joining Rust, he was with McCone Corporation and the Alabama Power Company.

"LUBRIPLATE, THE OUNCE OF PREVENTION"

says
VULCAN IRON WORKS, INC.
of Chicago, Ill.

—a leading manufacturer of pile driving and extracting equipment

"For many years we have used LUBRIPLATE Lubricants for shop assembly, and have recommended them to our customers through your LUBRIPLATE Tag Plan. Our experience shows that if the proper lubricants are used from the beginning, there are fewer problems and parts replacements later. We consider LUBRIPLATE to be the best possible ounce of prevention."—
H. G. Warrington, Vice-Pres.

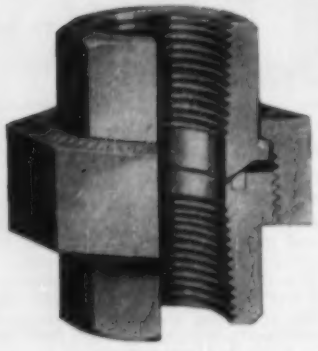
REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H.D.S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

. . . for MAXIMUM satisfaction

USE Jefferson A-4 PIPE UNIONS



. . . and be assured of reduction in installation and maintenance costs BECAUSE:

1 . . . They are made of air furnace malleable iron, averaging 55,000# p.s.i., insuring maximum basic strength.

2 . . . Material and construction permit their use in sizes ⅛" to 2" for 500# p.s.i. steam and oil at 550°F., or 2000" p.s.i. non-shock cold W.O.G.

3 . . . They are accurately machined, with seats truly ground and with seat rings cut from special drawn brass tubing; also available with iron-to-iron ground seats.

4 . . . Strength, long service life, uniform high quality and everlasting dependability are insured by rigid testing and inspection protection. Jefferson Unions are Underwriters' Laboratories approved; they can replace higher cost steel unions in services given.

90° and 45° Union elbows, Union tees and Flange Unions are also satisfaction-producing Jefferson items for you to use. Complete line includes 150#, 250# and 300# unions and union fittings.

Your nearest distributor can supply you . . . or contact us direct.

JEFFERSON UNION CO.

45 Fletcher Ave.
Lexington 73, Mass.

Every Joint a Tight Joint

Better Production Ideas and Methods

FOR FREE INFORMATION—Circle code number on page 17 or 18

X-1 DRAIN OR SAMPLING VALVE—Data Sheet No. 270, 2 pages—Describes and illustrates the company's No. 22 valve which has the valve stem seating on the outside of the valve body making it completely selfdraining. Features covered include outside screw and yoke construction, recommended pressures and materials. —JERGUSON GAGE & VALVE CO., 100 Felina Fellaway, Somerville 45, Mass.

X-2 STEAM BOILERS—Bulletin SB-50, 16 pages—Describes and illustrates complete line of steam generating equipment, with sectional views, diagrams, plant applications. Condensed reference material for consulting and power engineers.—ERIE CITY IRON WORKS, Erie, Penna.

X-3 CRANES AND AUTOMATION—New 12-page booklet "Planning the Crane for Its Use in Automation" answers many questions about the place of overhead materials handling in the trend towards automation. Sections of the booklet are: fundamentals of good plant operation; basic factors in crane selection; top running overhead cranes; gantry cranes; underslung cranes; crane interlocks; automatic handling application of cranes.—WHITING CORPORATION, Harvey, Illinois.

X-4 STEAM GENERATING EQUIPMENT—A bulletin on water tube boilers and steam generating equipment—Describes company's boilers and auxiliaries —water cooled furnaces, superheaters, economizers, air preheaters, and steam washers. Diagrams, tables and other boiler data included — EDGE MOOR IRON WORKS, Condenser Service & Engineering Company, Inc., Hoboken, N. J.

X-5 MOLYKOTE LUBRICANTS — Bulletin 105, describes two new "molykote" lubricants. Type 165X is an extreme bearing pressure open gear lubricant and Type LOEX which is suitable for extreme low temperature applications.—THE ALPHA MOLYKOTE CORPORATION, 65 Harvard Avenue, Stamford, Conn.

X-6 CONVEYOR BELTING — Wall chart, 23 in. x 33 in. contains 12 practical maintenance tips for getting more life out of belts. Deals with storage, correct design of loading chutes, use of automatic switches, lubrication, inspection and so forth.—HEWITT-ROBINS INCORPORATED, Stamford, Conn.

X-7 INSULATED CONTACT CONDUCTORS — 8-page catalog — Describes the low cost of Insul-8-Bar systems for the safetly electrification of American MonoRail cranes and monorails. The systems, available in capacities of 100 to 200 amps, are designed for use with either new or existing American MonoRail installations.—AMERICAN MONORAIL CO., 13107 Athens Ave., Cleveland, Ohio.

X-8 SPRAY-ON INSULATION PROTECTION—A 4-page bulletin—Describes "Spray-Mastic" protective coating for indoor and outdoor insulation. The protective asphaltic coating compound is easily sprayed on with any conventional type roofer's or undercoater's spraying equipment. Coating builds up to a ⅛ in. thickness. — EAGLE-PICHER COMPANY, 900 American Building, Cincinnati 1, Ohio.

X-9 FLEXIBLE BALL JOINTS—20-page catalog, No. 215-B—Describes many industry applications which highlight the versatility and economy of the ball joint. Catalog gives complete engineering specification and data. Also offers valuable tips on piping motion.—BARCO MANUFACTURING CO., 500 North Hough Street, Barrington, Illinois.

X-10 DUST FILTER—28-page Bulletin 559—Outlines how company's dust filter helps and aids in solving plant dust control problems. Includes diagrams, performance curves for various types of dust and so forth.—THE DAY COMPANY, 810 Third Avenue N.E., Minneapolis 13, Minnesota.

X-11 BUTTERFLY VALVES — 4-page Bulletin 650.20 — Describes company's Butterfly Valves which offer minimum space requirements and drop-tight performance. Contains complete product description and installational photos.—BUILDERS-PROVIDENCE, INC., 245 Harris Avenue, Providence, R. I.

KEEP UP-TO-DATE

- Ideas
- Methods
- Equipment

USE SPI READER SERVICE

See Service Card Pages 17-18

X-12 A GRINDING WHEEL—24-page booklet "How to Select Grinding Wheels for Precision Grinding, Tool and Construction Steels"—Contains three articles that appeared in "Grits and Grinds"—Norton's monthly magazine on better grinding. —THE NORTON COMPANY, Worcester 6, Mass.

X-13 MATERIALS HANDLING — 12-page booklet—Presents engineering and application data on Tramrail Overhead Materials Handling Equipment. Covers analysis of stresses in a number of types of overhead tracks, tract peening, and accessory equipment. — CLEVELAND TRAMRAIL DIVISION, The Cleveland Crane & Engineering Co., Wickliffe, Ohio.

For more data circle item code number on the postage free post card—p. 17

X-14 **SPRAYED METAL COATINGS**—4-page bulletin — Covers sprayed metal coating for contamination and corrosion protection. Considerable data of interest to food processing industries. Also covers combinations of Vinyls, Silicones, etc., for corrosion protection of tanks of all kinds. —METALWELD, INC., Scotts Lane & Abbottsford Avenue, Philadelphia 29, Pa.

X-15 **MECHANICAL COUPLINGS** — 12-page catalog—Describes company's line of "Spherefiex", spherical tooth couplings and provides complete data on installation, service factors, proper selection, specifications and lubrication.—PHILADELPHIA GEAR WORKS, Erie Avenue and G Street, Philadelphia 34, Pa.

X-16 **COAL PREPARATION EQUIPMENT**—Catalog No. 100, 35 pages —Describes complete line of coal preparation equipment by any process for any purpose. Illustrated by photographs, graphs and other technical data. HAWORTH ENGINEERING & MANUFACTURING CO., Birmingham 4, Alabama.

X-17 **GATE VALVES**—Circular No. 592 — Describes company's "Casual" Metal Gate Valves for corrosive service. Describes complete line, which has proved successful for handling corrosive fluids in refineries and industrial establishments producing caustics, textiles, rayons, fertilizers, coke, paper, etc.—LUNKENHEIMER COMPANY, Box 360, Cincinnati 14, Ohio.

X-18 **VISES**—Catalog 55—Specifications and prices on machinists', pipe, chipping, metalworking, workshop, woodworkers' and woodcraft vises. Lists and illustrates numerous vise accessories and replacement parts. Features two new additions to company's line.—THE COLUMBIAN VISE & MFG. CO., 9018 Bessemer Ave., Cleveland 4, Ohio.

X-19 **FLAW LOCATION** — Booklet, 12 pages—Describes in detail the Turco Dy-Chek inspection method and offers helpful suggestions on how to perform inspections on any metal by the dye penetrant method.—TURCO PRODUCTS, INC., 6135 S. Central Ave., Los Angeles 1, Calif.

X-20 **RAILROAD CAR SPOTTER**—Book 2092, 24 pages, shows how one man can easily spot six loaded railroad cars at one time, or handle scores of tasks involving horizontal haulage (in either direction or around corners) with the aid of a Link-Belt car spotter. Engineering information, instructions for calculating rope pulls and typical layouts for both car spotters and car pullers are available in this book.—LINK-BELT COMPANY, 307 N. Michigan Ave., Chicago, Ill.

X-21 **RELIEF VALVES** — Catalog No. 5200, 20 pages—Describes and illustrates Multiport relief valve for steam, air, or gas service, to provide maximum safety, overpressure regulation, substantial savings, and easy adjustment. Three styles are illustrated and construction features explained. —COCHRANE CORPORATION, 17th St. below Allegheny Ave., Philadelphia 32, Pa.

X-22 **HIGH CURRENT TEST UNITS**—Data Sheet Series 55, 4 pages—Describe full line of Multi-Amp portable high current test units for safely checking and calibrating electrically actuated protective devices. Includes recommended uses, electrical ratings, component equipment and physical dimensions. Illustrates each standard model.—MULTI-AMP CORPORATION, 10 Third St., Newark, N. J.

$$$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Southern Power & Industry
806 Peachtree St., N.E.
Atlanta 5, Georgia

Flexible Couplings

(*Starts page* 62)

adjust themselves to maintain proper contact with each of the coupling halves or sprockets. This naturally results in far better equalization of load distribution between the rollers, and provides for proper balance at high speeds.

Like other chain-type flexible couplings, these will accommodate some parallel and limited angular misalignment, and also a normal amount of end float.

The sprocket teeth have a face width to fit the half rollers. The portion of the tooth above the pitch line is not needed. Therefore, the outside diameter of these sprockets is only about 1/32-in. larger than the pitch diameter.

The roller-chain type of flexible coupling has been called the Henry Ford of flexible couplings. It is a reliable, rugged coupling, of low cost, high efficiency, and provides for simplicity in coupling and uncoupling without removing either driver or driven shaft.

Where silent chain is being used for making a flexible coupling, it is necessary to provide the coupling with a guide link, fitting into a groove on one sprocket, or with some other "keeping" device, which will prevent the chain from working sidewise on the two sprockets connected. On silent chain flexible couplings, the same as on roller

Thomas M. Creel, operating out of Atlanta, Georgia now brings you immediate factory service and engineering assistance on installation and use of nationally known Cambridge products:

The Cambridge Wire Cloth Co.
Cambridge, Maryland

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

OFFICES IN LEADING INDUSTRIAL AREAS

Meet
Tom Creel
new
Cambridge
Sales Engineer for the Southeast

WOVEN WIRE CONVEYOR BELTS
combining movement with processing

INDUSTRIAL WIRE CLOTH
Bulk or Fabricated Parts

SPECIAL METAL FABRICATIONS
Crates, Baskets, Racks, Trays

Call Tom at any time - - - Ask your operator to get you The Cambridge Wire Cloth Company, Atlanta, Georgia.

chain, connection is often by means of a through pin, which is in turn held in place by a cotter pin.

Housing Application

After a chain-type flexible coupling has been installed, the two halves of the split covering case (assuming one is to be used) may be filled with grease and put in place, using grease recommended by the coupling manufacturer. Usual practice is to put enough grease into the case so that a certain amount of it will be forced out when the case is pulled together.

Some covers used for flexible couplings of chain type are provided with accessible oil holes for lubrication, and some have Zerk fittings. In most cases, revolving housings are used, though stationary housings can be and sometimes are applied. Some housings for these couplings are made of spun metal, others of plastic, and still others of welded steel.

ERNST

SIGHT FLOW INDICATORS

"See What Goes On Inside"

For insertion into pipe

FOR EVERY APPLICATION

BRONZE, IRON, STEEL, STAINLESS STEEL

FIG. 29 Cylinder with Impeller

FIG. 17-28 Cylinder

FIG. 215 Flanged

FIG. E-37 Double Window

FIG. 212 Visibility Welding Neck or Screw

FIG. E-811 Flapper

FIG. E-1810 Rotating Wheel Type

All sizes up to 6" Send for Catalog

ERNST WATER COLUMN & GAGE CO.

LIVINGSTON, N. J.

Fuel Bill Cut

(Starts on page 54)

tained during the period of operation. The air flow meter is not really a flowmeter, but is a means of recording combustion air supplied. For this reason, the measurement of the pressure drop caused by the products of combustion should be accomplished as close to the furnace as practical.

2. The location of the air flow meter taps is **normally** across the last pass baffle. Because of the variety of current boiler designs, this may not be the optimum location because of insufficient pressure drop, potential slagging conditions, etc. It may be that after discussing this problem, the boiler manufacturer and the operating personnel agreed that this new pressure tap location was satisfactory—all other factors having been adequately considered.

3. The possibility of air leakage into the setting which may indicate a false low air flow must be considered. It is well known that air leakage generally increases as the gases approach the induced draft fan.

The preceding paragraphs are points for consideration which the writer would want to review prior to making a decision as to the most satisfactory air flow tap location.

Furnace Draft Adjustment

From the sketch of the boiler shown as Figure 1 of Mr. Spring's article (SP&I for July, page 51) and his description of its use, it occurs that this damper may be the "gas exit boiler damper," as it may also be referred to.

On boilers of this size, the induced draft fan is usually operated at a constant speed and there are generally no inlet means by which to control the flow of gas into the fan. Is this the condition which exists on this boiler or group of boilers? If this is the case, by adjusting the position of this damper at various steam flows, the furnace draft may be held nearly constant or more uniformly regulated.

Stabilized furnace conditions are a cardinal principle for safe and **efficient** boiler operation. In the opinion of the writer, this damper should be adjusted, remotely by the operator, to maintain 0.0 to 0.15 inches of water negative pressures in the upper area of the furnace. This condition should be an operating requirement during the entire time the boiler is in operation.

In all probability, this damper is **not** for controlling flue gas temperature. Is not the flue gas temperature a function of the design of the boiler, but also affected by the gas velocity through the gas passages in the boiler? A decrease in flue gas temperature of this magnitude (80 F) should serve as a warning to operators to look for trouble if allowed to continue.

The writer is very much interested in power plant engineering and has obtained valuable experience and training under excellent supervision in a large industrial power plant during recent years.

By E. R. Fryer, North Augusta, S. C.

It's going on all the time!

Foreign solids accumulate in boilers continuously. If you would hold the concentration within suitable limits it follows that removal must also be continuous. You cannot expect to maintain efficient trouble-free steaming by blowing now and then; but too often you can expect to upset the load balance and waste a lot of heat units as well as money down the drain. Why not learn about the modern way to blow boilers, save trouble, save money and avoid stress upon equipment; write for catalog on "Correct Blow-Off" to *The Madden Corp., 1543 W. Morse Ave., Chicago 26, Illinois.*

"Electricity and Electrical Power"

A limited edition of this important handbook has just been printed and is available to subscribers to SOUTHERN POWER AND INDUSTRY only. Order your copy NOW with a new or renewal subscription to this magazine.

Yes! I accept your invitation. You may enter my 3-year subscription to SOUTHERN POWER AND INDUSTRY and send me my personal copy of Electricity and Electrical Power at the special combination rate of $3.00.

☐ Enclosed find $3.00 ☐ Send bill for $3.00

NAME .....

ADDRESS .....

CITY .....STATE .....

CLASSIFICATION DATA

If an individual give name of firm connected with and title of position.

Firm .....Position .....

Products manufactured or nature of business .....

Enclose coupon with remittance. If you want to be billed, send coupon alone.

CONTINUOUS BLOW-OFF

needs NO maintenance with the ROTARY DISC

UNIBLOW VALVE

Complete blow-off unit includes sedimentation chamber, clean out valve, by-pass line and Uniblow Rotary Disc Valve.

Stainless steel rotary disc valve offers 15 calibrated orifices to provide any rate of flow. Sediment chamber protects orifices from plugging. No moving parts to wear out or leak.

Read how to cure blow-off problems and save on fuel! *Write for bulletin Today!*

THE UNIBLOW VALVE COMPANY
1920 W. 77th ST., CLEVELAND 2, OHIO

Classified Advertisements

Classified rates are net, payable in advance, each month. Rates are based on column inch, with three columns per page, 10 inches per column, column width 2⅛ inches —a total of 30 column inches per page.

CLASSIFIED RATES

$8.00 per column inch

$16 per column inch displayed

Rates quoted on special types of repeated advertisements.

Special "Position Wanted" Advertisements submitted by individuals seeking employment, 10 cents per word per insertion, payment with order, minimum charge $2.00. When used, Box Number address, c/o SOUTHERN POWER & INDUSTRY, 806 Peachtree Street, N.E. Atlanta 5, Georgia, count as eight words.

SAVE $$$$

By having your Safety-Relief-Gate-Globe-Check Valves rebuilt or serviced by us. Staffed with factory trained personnel we are able to give a new valve guarantee, cut down on tie and freight charges. Work performed either in your plant or ours. Complete insurance carried. For particulars write:

SOUTHERN VALVE CORPORATION
2937 WEST BEAVER STREET
JACKSONVILLE 5, FLORIDA

AUTHORIZED REPAIR, MAINTENANCE & SALES AGENCY FOR SAFETY & RELIEF VALVES

CASH

FOR USED TRANSFORMERS

Convert your used transformers to cash! Send us a description of them TODAY. *Transformers and Coils built to your specifications.* Send blueprint, for prompt quotation.

TRANSFORMERS BOUGHT, SOLD and REPAIRED

40 Years Dependable Service

THE ELECTRIC SERVICE CO.
5323 Hetzel St., Cincinnati 27, Ohio

Master GLASSES
MAGNIFYING
HIGH PRESSURE GASKETS
All sizes to fit your gages
ERNST WATER COLUMN & GAGE CO.
Send for Catalog LIVINGSTON, N. J.

DIXIE ENGINEERING COMPANY
"Manufacturer's Agents"
P. O. Box 750 812-813 Protective Life Building
BIRMINGHAM 3, ALABAMA
Sabol E. Baum Telephone 4-0417

RENEW YOUR SUBSCRIPTION TO SOUTHERN POWER AND INDUSTRY

Index of Advertisers

This Advertisers' Index is published as a convenience, and not as part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert

A

Adam Cook's Sons, Inc. ... •
Air Preheater Corp. ... •
Allen-Bradley Co. ... 5
Allen-Sherman Hoff Co. ... •
Allis-Chalmers Mfg. Co. ... Second Cover
Allpax Co., Inc. ... 106
American Blower Corp. ... •
American Chain Division, American Chain & Cable Co. ... 82
American Engineering Co. ... •
American Monorail Co. ... 34
Ames Iron Works ... •
Anaconda Wire Cable Co. ... 81
Annin Co. ... •
Armco Drainage & Metal Prod., Inc. ... 98
Armstrong Machine Works ... 69
Atlantic Steel Company ... 93

B

Babbitt Steam Specialty Co. ... 118
Babcock & Wilcox (Boilers) ... 23
Babcock & Wilcox Refractory Div. ... 67
Bailey Meter Co. ... 40 & 41
Bell and Zoller Coal Co. ... •
Belmont Packing & Rubber Co. ... 95
Bird-Archer Co. ... •
Blackmer Pump Co. ... 117
Boiler Tube Co. of America ... 107
Bonney Forge & Tool Works ... 66
Borden Metal Products Co. ... 44
Buell Engineering Co., Inc. ... •
Bunting Brass & Bronze Co. ... •
Bussman Mfg. Co. ... 8 & 9
Byers Co., A. M. ... 7
Byron Jackson Div. Borg-Warner Corp. ... •

C

Cambridge Wire Cloth Co. ... 113
Carey Mfg. Co., Philip ... •
Catawissa Valve & Fitting Co. ... 102
Chapman Valve Mfg. Co. ... 42
Chesapeake & Ohio Railway Co. ... 20
Chicago Bridge & Iron Co. ... •
Chicago Exposition of Power & Mechanical Engineering ... •
Cities Service Co. ... 79
Clarage Fan Co. ... 1
Classified Ads ... 115
Cleaver-Brooks Co. ... •
Cochrane Corporation ... Fourth Cover
Cole Mfg. Co., R. D. ... 100
Combustion Control Division Electronics Corp. of America ... •
Combustion Engrg., Inc. ... 25
Combustion Equipment Division Todd Shipyards Corp. ... •
Commercial Solvents Corp. ... 13
Continental Gin Co. ... Third Cover
Cooper-Bessemer Corp. ... •
Copes-Vulcan Division — Continental Foundry & Machine Co. ... •
Crane Company ... •
Cyclotherm Corp. ... 108

D

Dampney Co. ... 90
Dean Hill Pump Co. ... •
Diamond Chain Co., Inc. ... 77
Dixie Engineering Co. ... 115
Dowell, Inc. ... •
Drew & Co., Inc., E. F. ... •
Durabla Mfg. Co. ... 88
Durametallic Corp. ... •
Durkee-Atwood Co. ... •

E

Electric Service Co. ... 115
Elgin Softener Corp. ... •
Erie City Iron Works ... •
Ernst Water Column & Gage Co. ... 114 & 115
Evans Rule Co. ... •
Everlasting Valve Co. ... •

F

Fairbanks Co. ... 92
Finnigan, J. J., Co., Inc. ... 118
Fisher Governor Co. ... •
Fiske Bros. Refining Co., Lubriplate Div. ... 111
Flexible Steel Lacing Co. ... •
Forty Eight Insulations, Inc. ... 82
Foster Engineering Co. ... •
Foster Wheeler Corp. ... •
Frick Company ... •

G

Garlock Packing Co. ... •
General Coal Co. ... 118
General Electric Co. ... 35, 36, 37 & 38
Goulds Pumps, Inc. ... 87
Graver Water Conditioning Co. ... •
Grinnell Co., Inc. ... •
Gulf Oil Corp. ... 33

H

Hotel Pittsburgher ... •

I

Illinois Water Treatment Co. ... •
Ingalls Iron Works Co. ... 96
Ingersoll-Rand Co. ... 97
Iron Fireman Mfg. Co. ... •
I-T-E Circuit Breaker Co. ... •

J

Jefferson Union Co. ... 112
Jenkins Bros. ... •
Jerguson Gage & Valve Co. ... •
Johns-Manville, Inc. ... 26

K

Kano Laboratories ... •
Kellogg Company, M. W. ... 27
Kennedy Valve Mfg. Co. ... 105
Kerrigan Iron Works, Inc. ... •

L

Ladish Co. ... •
Leslie Co. ... 117
Limi Torque Corp. ... 62
Lubriplate Division, Fiske Bros. Refining Co. ... 111
Lummus Co. ... •

M

Madden Corp. ... 114
McBurney Stoker & Equipment Company ... •
Magnetrol, Inc. ... •
Manning, Maxwell & Moore, Inc. ... •
Manzel, Inc. ... 28
Marley Co., Inc. ... 89
Mason-Neilan Regulator Co. ... 65

N

National Airoil Burner Co. ... •
National Aluminate Corp. ... •
National Business Publications ... •
National Coal Association ... 85
National Supply Co., Spang-Chalfant Div. ... •
National Tube Co. ... •
National Valve & Mfg. Co. ... 91
Naugatuck Chemicals Div. U. S. Rubber Co. ... 71

O

Oakite Products, Inc. ... •
Otis Elevator Co. ... •

P

Pacific Pumps, Inc. ... •
Panalarm Products, Inc. ... 102
Panellit, Inc. ... 103
Peerless Pump Division Food Machinery & Chemical Corp. ... 75
Petro ... •
Philadelphia Gear Works ... 63
Pittsburgh Piping & Equipment Co. ... 24
Powell Valves ... •
Powers Regulator Co. ... 73
Prat-Daniel Corp. ... 101

Q

Queen City Engineering Co. ... 21

R

Reliance Gauge Column Co. ... 86
Republic Flow Meters Co. ... 32
Resolite Corp. ... •
Riley Stoker Corp. ... 14 & 15
Roper Corporation, Geo. D. ... 78

S

Sarco Co., Inc. ... •
Sinclair Refining Co. ... 11
Southern Natural Gas Co. ... 22
Southern Power & Industry ... 70, 115
Southern Railway System ... 30
Southern Valve Corp. ... 115
Southern Water Conditioning, Inc. ... •
Sprague Electric Co. ... •
Standard Oil Co. of Ky. ... 57
Stephens-Adamson Mfg. Co. ... •
Sterling Electric Motors, Inc. ... 110
Stone & Webster Engineering Corp. ... 91
Stromberg-Carlson Co., Telephone Division ... •
Subox, Inc. ... •
Superior Combustion Industries, Inc. ... •

T

Terry Steam Turbine Co., The ... 39
Texas Co. ... 2
Thermobloc Div. of Prat-Daniel Corp. ... 101
Thomas Flexible Coupling Co. ... •
Todd Shipyards Corp., Combustion Equipment Division ... •

U

Uniblow Valve Co. ... 115
United States Steel Co. ... •
U. S. Treasury ... •

V

Virginia Gear & Machine Co. ... 62
Vogt Machine Co., Henry ... 29
Voss Company, J. H. H. ... 104

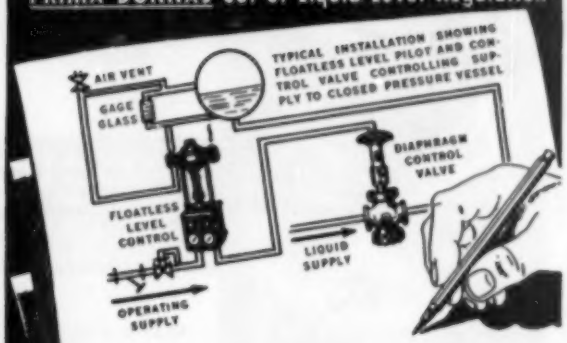
W

Walworth Co. ... 55
Want Ads ... 115
Warren Steam Pump Co., Inc. ... 99
Webster Engineering Co. ... 117
Western Precipitation Corp. ... •
Westinghouse Electric Corp. ... 61
Wiegand Co., Edwin L. ... 109
Wilson, Inc., Thomas C. ... •
Wing Mfg. Co., L. J. ... •

Y

Yarnall-Waring Co. ... 59

LESLIE *Floatless* Level Control takes the PRIMA DONNAS out of Liquid Level Regulation


TYPICAL INSTALLATION SHOWING FLOATLESS LEVEL PILOT AND CONTROL VALVE CONTROLLING SUPPLY TO CLOSED PRESSURE VESSEL
AIR VENT
GAGE GLASS
DIAPHRAGM CONTROL VALVE
FLOATLESS LEVEL CONTROL
LIQUID SUPPLY
OPERATING SUPPLY

Here's level control that's unaffected by surface agitation and equipment vibration. Provides steady, positive control even under extreme conditions.

Simple, compact, one-adjustment unit installed anywhere below liquid level. Diaphragm-stem assembly is only moving part . . . no linkages, torque tubes or floats. Doesn't require recalibration during service. Thousands in service giving instrument control (±1" column of water).

SEND FOR DESCRIPTIVE DATA FC-57

LESLIE

TOPS IN QUALITY PRESSURE LEVEL AND TEMPERATURE CONTROLS
Since 1900

LESLIE CO., 261 **Grant Ave., Lyndhurst, New Jersey**

Handy Pump says:

"STOP waste! . . . dispense liquids from drums, barrels and storage tanks with BLACKMER Hand Pumps"

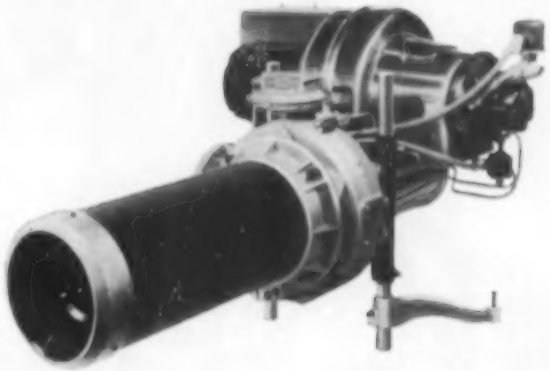
BLACKMER PUMPS

liquid materials handling ®

BLACKMER

Industrial, Hand and Truck Pumps, Strainers, Pressure Control Valves
BLACKMER PUMP COMPANY, GRAND RAPIDS 9, MICH.
DIVISION SALES OFFICES — NEW YORK • ATLANTA • CHICAGO
GRAND RAPIDS • DALLAS • WASHINGTON • SAN FRANCISCO
See Yellow pages for your local sales representative

WEBSTER'S New



CYCLONETIC*
DUAL FUEL BURNER

The Webster Cyclonetic* represents another step in the continuous effort of the Webster Engineering Company to provide the industry with carefully designed and tested combustion equipment, capable of satisfying the requirements of those who demand the ultimate in quality and service.

The development of the Cyclonetic* introduces a unique method of accomplishing flame retention and stability of a gas flame in a gun-type burner with no sacrifice of efficiency or safety when firing either gas or oil.

The Webster Cyclonetic* Dual Fuel Burner is designed to operate on either gas or light oil with only the flick of a switch necessary to change from one fuel to another. Employing 100% forced draft, the Cyclonetic* provides fully automatic operation on both fuels, with complete programming and safety built in.

*Trademark

WRITE FOR LITERATURE

The WEBSTER ENGINEERING COMPANY
TULSA, OKLAHOMA
Division of SURFACE COMBUSTION CORPORATION, Toledo, Ohio

Westmoreland Coal Company

HAMPTON COAL · CRITERION COAL

Stonega Coke and Coal Company

GLENBROOK · RODA · CROSSBROOK · STONEGA · DENDRON

Page Coal and Coke Company
Crozer Coal and Land Company

LYNCO · CROZER

PREMIUM ANTHRACITES
Products of Jeddo-Highland Coal Company
Hazle Brook—Raven Run

Genco Anthracites & Bituminous Coals

General Coal Company

123 SOUTH BROAD STREET . . . . . PHILADELPHIA 9, PA.
SUBSIDIARY SALES COMPANY—EASTERN COAL & COKE COMPANY
Cable Address: GENCO

Branches

BLUEFIELD, W. VA. · BUFFALO · CHARLOTTE, N. C.
CINCINNATI · CLEVELAND · IRWIN, PA.
NEW YORK · NORFOLK

NEW! Re-Designed

Babbitt
—Adjustable—
SPROCKET RIM
with Chain Guide

ANY VALVE is readily accessible *from the floor* with low-cost Babbitt Sprocket Rim. Now re-designed for—

- **Greater strength**
- **Easier, quicker, more solid assembly**

Simplifies pipe layouts, prevents accidents, fits all valve wheels. Your supplier carries complete stocks. Call him — or write for folder and prices.

Babbitt STEAM SPECIALTY CO.

3 BABBITT SQUARE, NEW BEDFORD, MASSACHUSETTS, U. S. A.

9,000 gal. pressure tank fabricated in FINNIGAN'S modern shop for plant in Lake Charles, La. Dia. 78"—Length 38'

build FINNIGAN *quality*
INTO *YOUR* PRESSURE VESSELS!

TANKS,
SMOKESTACKS
PIPING, BREECHING
WATER HEATERS
PLATE WORK
BOILERS

Pressure vessels fabricated by FINNIGAN are built to rigid ASME Codes! Over 65 years of plate fabrications have given FINNIGAN Engineers and Craftsmen the know-how to build the finest of equipment. That's why the FINNIGAN *guarantee* can specify that equipment by FINNIGAN is equal to or better than that of any other manufacturer!

Call, wire or write today for further information . . . there is no obligation.

J. J. FINNIGAN CO. INC.
722 MARIETTA ST., N.W., ATLANTA

P.O. BOX 6025, HOUSTON 6, TEXAS
4431 MAPLE AVE., DALLAS 9, TEXAS
P.O. BOX 2527, JACKSONVILLE 4, FLA.
4108 C. ST., LITTLE ROCK, ARK.
3714 14th ST., N.W., WASHINGTON, D.C. 629 BARONNE ST., NEW ORLEANS, LA.
401-402 BUILDERS BUILDING, CHARLOTTE, N.C. 41 E. 42nd ST., NEW YORK 17, N.Y.

CONTINENTAL CONVEYORS

Serve Every Type of Industry

CONTINENTAL CHECK LIST
For Every Industry

CONVEYORS

- BELT CONVEYORS
- FLIGHT CONVEYORS
- SCREW CONVEYORS

ELEVATORS

- BUCKET ELEVATORS
- SCREW ELEVATORS
- BELT OR CHAIN
- CONTINUOUS
- SUPER-CAPACITY
- PERFECT DISCHARGE

FEEDERS

- BELT FEEDERS
- PLATE FEEDERS
- SCREW FEEDERS
- RECIPROCATING
- VANE FEEDERS
- HEAVY DUTY CAST MANGANESE
- APRON FEEDERS

POWER TRANSMISSION EQUIPMENT

- BEARINGS
- STEEL PULLEYS
- CAST IRON PULLEYS
- CHAIN DRIVES
- SHAFTING
- COLLARS
- CLUTCHES
- SPEED REDUCERS
- V-BELT DRIVES
- SHAFT HANGERS

ID-5512

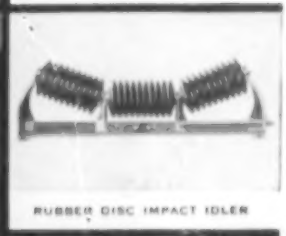
SHIP LOADING

STANDARD DUTY IDLER

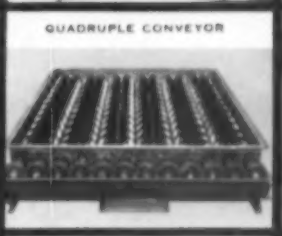
QUARRIES

GRAIN HANDLING CONVEYOR

FEED MILL


RUBBER DISC IMPACT IDLER

MINES

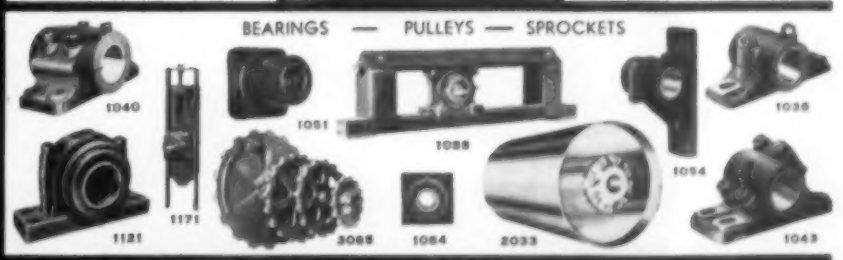

QUADRUPLE CONVEYOR

COAL MINES

CARBIDE PLANTS

POWER PLANTS

OIL MILLS



INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

BIRMINGHAM, ALABAMA

ENGINEERS — ATLANTA • CLEVELAND • DALLAS • KNOXVILLE — MANUFACTURERS

MEMPHIS • NEW YORK 17, NEW YORK

A FEW MAJOR COCHRANE DEMINERALIZER INSTALLATIONS

- **Large Oil Company**
  Capacity 420,810 lbs. per hr.
  Automatic Control
- **Southern Paper Mill**
  Capacity 405,000 lbs. per hr.
  Automatic Control
- **Textile Manufacturer**
  Capacity 360,000 lbs. per hr.
  Automatic Control
- **Utility**
  Capacity 266,400 lbs. per hr.
  Automatic Control
- **Aluminum Producer**
  Capacity 387,000 lbs. per hr.
  Automatic Control
- **U.S. Government**
  Capacity 298,800 lbs. per hr.
  Automatic Control
- **Automobile Manufacturer**
  Capacity 182,268 lbs. per hr.
  Automatic Control
- **Pharmaceutical Company**
  Capacity 29,880 lbs. per hr.
  Automatic Control
- **Chemical Manufacturer**
  Capacity 15,000 lbs. per hr.
  Manual Control
- **Steamship Installation**
  Capacity 1,776 lbs. per hr.
  Manual Control

For your protection
buy **Cochrane's** *experience*
in demineralization

An impressive list of Cochrane 2-bed, 3-bed, 4-bed and mixed bed Demineralizer installations have been providing continuous protection for years in many outstanding high pressure power plants in public utility and industrial fields.

The illustration above is just one of many such installations. Designed for a large paper company, it produces an effluent with a silica content of as low as 0.02 ppm and total dissolved solids of as low as 0.4 ppm. Cation units are 6′ x 6′ and anion units 6′ x 8′ providing demineralized water supply of over 100,000 lbs. per hour for 1200 psi boilers.

Demineralized water quality is superlative. Cochrane's progress in solving the many problems associated with demineralization is the result of untiring research by their staff of chemists, engineers and research men. This background is your assurance of satisfactory operation. Why not take advantage of it? For the answer to your water conditioning problem . . . consult Cochrane first. Ask for Bulletin 5800-B.

Cochrane
CORPORATION

Representatives in 30 principal cities in U.S.; Toronto, Canada; Paris, France; La Spezia, Italy; Mexico City, Mexico; Havana, Cuba; Caracas, Venezuela; San Juan, Puerto Rico; Honolulu, Hawaii.
Pottstown Metal Products Division—Custom built carbon steel and alloy products

3110 N. 17TH STREET, PHILADELPHIA 32, PA.
NEW YORK • PHILADELPHIA • CHICAGO

Demineralizers • Hot Process Softeners • Hot Zeolite Softeners • Dealkalizers • Reactors • Deaerators • Continuous Blowoff Systems • Condensate Return Systems • Specialties